Commodore NETWORK

Vol 4 No 10 November 1995

AUSTRALIA

SUPPORTING THE 8 BIT RANGE OF COMMODORE COMPUTERS

NEWSWATCH

CMD'S NEW ACCELERATOR

CMD has announced that it is developing a new line of accelerators for the Commodore 64 and 128 computers.

The Super64CPU series design is based on the Western Design Center W65C816S microprocessor which was used in the Apple IIGS and is currently employed in the SNES (SuperNintendo Entertainment System).

The new series is scheduled to debut in February 1996 with two models: the Super64/10 (10 MHz) and Super64/20 (20 MHz).Both accelerators will operate on Commodore 64 and 64c computers, as well as in 64 mode on Commodore 128 and 128D models.

Acceleration will be switch-selectable as well as software-selectable. An additional switch will allow you to completely disable the accelerator or select between Standard and JiffyDOS operating modes.

Other announced features include 64K of fast static RAM, 64K ROM, and a built-in pass-through port for connecting compatible cartridges and RAM devices.Devices that will be compatible with the Super64CPU's include:

Commodore 17xx series REU's, CMD RAMLink, Berkeley Softworks' GEORAM, Commodore 15xx series drives, CMD HD & FD series drives, CMD SwiftLink

Super64CPU accelerators will provide high-speed with many software applications including GEOS, telecommunications and BBS programs, productivity and utility software, as well as most BASIC programs.

Retail prices are estimated to be $149.95 for the Super64/10, and $199.95 for theSuper64/20.

A 128 version may be considered, and may be made available in mid 1996 if approval is given in coming weeks.

If anyone wants to voice their opinion to CMD concerning a 128 version, don't call. Just send a postcard with your opinion to: 128 Accelerator c/o Creative Micro Designs, Inc. P.O. Box 646 East Longmeadow, MA 01028-0646 USA

NEW COMMODORE PUBLICATIONS

Three new publications have recently surfaced in the United States. They are "The Gatekeeper", a bi-monthly (once every two months) publication in an 8.5" X 11" format and consisting of around 12 pages. Published by Bryan Pease, subscriptions in the U.S. costs $11 a year, or $2.00 for a sample issue. Sorry, I have no prices for outside the United States.

Contact: Bryan Pease, attn: the Gatekeeper 610 First Street Liverpool N.Y. 13088 U.S.A.

The second new publication is "GEOS Publication", a newsletter type production similar to GeoNews. Naturally enough, it is aimed fairly and squarely at the GEOS user, and is published monthly. At a cost of U.S. $850 a year (U.S. only) for 20 pages it looks good value, however, I have no prices for overseas subscriptions, so it will pay to contact the editor first before forwarding any money. the contact address is: GEOS Publication 713 E. Main Street Independence KS 67301-3726 U.S.A.

Our third new item is disk-based and called "Commodore Gazette". I've yet to see a copy, but its U.S. subscription price is U.S. $12 per year. I have no information as to frequency of issue.Contact: Christopher Ryan 5296 Devonshire Rd. Detroit MI 48224-3233 U.S.A.

We will have a review of "GEOS Publication" in the next issue, and hope to arrange reviews of both of the others over coming issues.

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Welcome to another Commodore Network.

This issue could almost be termed a "Programmer's Edition" since it seems to be almost entirely devoted to that particular facet of our computing hobby. Within this month's pages you will find the first in a series of articles by Peter Boothman dealing with memory management/manipulation.

Now, before you shrug your shoulders and say "Woh! That's way above my head", how about having a look at it. If you are at all interested in programming, this article could prove invaluable.

We also welcome back the enigmatic Marc Walters with the return of PMCC (Programmer's Machine Code Column). Marc has really outdone himself in his return, with a monster article dealing with BASIC ROM floating point math routines.

This is more than probably the most thoroughly documented and accurate article of its type EVER published, and covers all the C64's major ROM math routines, complete with their entry points, being the result of two months research and testing.

Although this article is of a size that would normally be split into two or more "installments", I decided that it deserved inclusion as a whole within a single issue. I felt it would be too valuable a reference source to be spread out over several editions.

Naturally, this has meant that a cut back in the size of, or the complete dropping of, several columns/articles was necessary to include PMCC in its entirety. These columns/articles will hopefully re-appear next month, so don't despair.

THE LONG LOST INSERT

Last month's Editorial mentioned our annual subscription drive, and an insert that was supposed to be included within the magazine.

Well, in our rush to get C.N. out to you lot, it didn't get inserted, did it! It SHOULD be found in this issue however.

The "Introduce a Friend" promotion is open to everyone, everywhere, and offers substantial incentives to you for introducing a new subscriber. Be sure to fill in your form completely so that we know who has introduced whom (and thus ensure that the right person gets the right bonus).

NEW PRODUCTS

Two new products havejust turned up in the mail this day from Threshold Productions in the U.S.A..

They are "Flummi's world" and "Gangster/Time Traveller", both of which are arcade games. These will be reviewed in either "Power Drift" or "Showcase" in coming months.

Apparently, three more are on their way for review also, and we are hoping to have these available for you to purchase shortly. Two other Threshold Games, "Lazer Duel" and "Slaterman" will have reviews published shortly also. Demonstration versions of two Threshold games will appear on next month's Disk-Coverer.

On a more disappointing note, I have already come across a pirated copy of "Slaterman". This pirated version originated in Europe (Britain to be precise) and has just found its way to Australia.

Jonathan Mines of Threshold Productions and his associates do go to considerable trouble to produce products for Commodores. They know they will NOT make a fortune catering for a "dead" computer, and, indeed, they would be lucky to break even, but they have had a go.

When will Commodore users learn that to have people rob those few creators we have left of what little reward they may get for their efforts is tantamount to shooting yourself in the foot. If these pirates truely believe that all software should be free (or is that just other peoples creations?), why aren't they creating and distributing their own quality programs instead of destroying what little commercial support Commodore owners now have.

These programs are NOT copy protected, so it DOES NOT take much of a brain to copy them. It does, however, take considerable time and effort, AND a bit of nouse, to create them. Let's support these people, not rob them of a just reward!

Commodore Network WILL be bringing in and distributing Threshold products in Australia, despite the pirates. If it was a commercial decision, and not one based on trying to offer maximum Commodore support, however, I'm afraid this incident would cause me to reconsider.

WELCOME

On a brighter note, we have a couple of writers to welcome (or welcome back) in Marc Walters and Peter Boothman. Both gentlemen have a very solid grounding in the Commodore 64 and are widely known and respected within the commodore comunity. It's great to have them share some of their immense knowledge with us. Welcome fellows!

Warren

What follows is a readers method of creating graphics in geoPaint, from Peter J McGuinn of Christchurch NZ. I hope that Peter's experience will be of interest to other geoPaint users, to see what can be achieved with a minimum of equipment, and some clever lateral thinking.

Creating Graphics in geoPaint

First of all I would like to say the method I use is very, very SLOW, but still it is not a race when working with GEOS. I have tried drawing in free hand and the grid line plus the moving mouse such as Ted Woodwell showed in the GEONEWS NEWSLETTER {Oct94} [and in CN Mar93], but found the drawings came out too small, or had too many pixels to take off the geoPaint page. Still [a] very good idea though.

What I wanted to do was, what ever size drawing I was wanting to put onto the geoPaint page, had to be the same size when I printed it out.

Anyway, this is the way I did it :

1. First I made a Pattern Page which was done in geoPaint. I covered a full geoPaint page with the very small squares from the Pattern Fill in geoPaint then printed it out. You can print out two copies, or [do] as I do, [and] go to a [copy] shop and have the first [printout] photocopied.

2. Next you will need a sheet of A4 size Tracing Paper plus a Picture which you want to have [in geoPaint format].

3. Trace picture onto Tracing Paper.

4. Using a Clip Board, place the Pattern Page plus the Tracing Paper with the drawing, on it. Fix with a clip to Clip Board. Now place the other Pattern Page next to it.

5. Using a felt pen or coloured pencil. {Looking through the Tracing Paper, you should be able to see the small squares of the Pattern Page.

Each small square represents FIVE pixel squares Up or Down, to be Filled in on the other Pattern Page with a Felt Pen}. Follow the Lines of your drawing and Draw onto the other Pattern Page. After you have completed the Drawing, go back to geoPaint open your document and go to Pixel Edit Mode and redraw your copy of your drawing. For larger drawings just add extra pages. That's it.

Tip : An A4 sized page will give you a drawing of about 50mm high. If you copy your Felt Pen Drawing back to the 1st Pattern geoPaint file, just fill in the empty squares with the Faucet and the Pattern Black Fill to give you an A4 sized drawing, though you will have to remove the grid lines and touch up the drawing to take out sharp corners. Also if you print out using EPSON RED printer driver you will have another two sizes of the same drawing.

The picture sample is of JIMINY CRICKET.

Gg. Well done Peter. I hope that some other users will have benefited by the sharing of your experience. Thank you for writing your account for us.

Gg - My Story

When I first discovered GEOS early in 1988, my equipment consisted of my first C64 {1983 vintage}, one 1541 disk drive {1985 vintage}, a C1525 as MPS801 {1983 vintage} printer, a Joystick and a SUNCOM IconTroller, and GEOSv1.2 System Disk.

Many people are beginning this way in 1995. I sympathize with them, and I try not to overwhelm them, but to keep their interest and curiosity alive. Back then I wanted to create Art with geoPaint, and I couldn't see any limitations in this set up. Ignorance is bliss, and when people tried to tell me I couldn't achieve anything with the equipment that I had, I went ahead anyway, and I am now enjoying myself with all that GEOS can offer.

Work Disks

One of the first things you learn with

GEOS is about Work disks. You must set up work disks with different disk names and organize yourself. Funny thing was, every time I added to my system {equipment or GEOS version} I had to do this again, and again.
With v1.2 'tedium ad infinitum' becomes obvious, but to accomplish anything you must face it. For more detail on preparing Work disks, refer to the section 'GEOS Work Disks' in 'The World of GEOS HandBook I'.

{**}Boot Up C64 LOAD ":*",8,1 {C128 Autoboots disk on power up}After booting GEOS on a single drive system, you click on the file menu from deskTop and select the format option, to prepare a work disk.
The deskTop then prompts you with a dialog box to enter a 'diskname,id' up to 16 characters. At this point remove the system disk and insert the disk you intend to make your work disk, then press RETURN. When the format is complete the blank deskTop of your work disk is displayed.
Next re-insert your system disk and click on the disk in the upper right corner of the screen to make it active. Then click once on the deskTop icon to highlight it, then click again to get the ghost icon and drag it to the border area below the deskTop page itself, but avoiding the printer icon and the trashcan icon that also reside there in the bottom right corner of the screen. Also drag the icons of geoPaint, photo manager, at least one font, a printer driver, and an input driver to the border area. This border area is also known as the off-page-directory. For more information on the off-page-directory, refer to the section 'Examining GEOS Sectors' in 'The HandBook of Commodore Disks'.

The First geoPaint Work Disk

Next, you need to insert your work disk, and open it by clicking on the disk icon.
Then you click on deskTop icon in the border area to highlight it, then click again to get the ghost icon and drag the ghost up to the work disk deskTop page, and click again.
GEOS then prompts from a dialog box, to insert your system disk and click OK when you have done this. The deskTop program is read from the system disk until you are again prompted from a dialog box, to insert your work disk back into the drive. The deskTop program is then written to your first work disk.
Now you must put the system disk back in the drive and click on the drive icon to activate it.
You will notice that the deskTop icon is still in the border area. Click on it once to highlight it, then click again to get the ghost icon and then drag the ghost icon back up to the deskTop of the system disk. The deskTop program is then returned to its position on the system disk. Now you must follow the same process for the other files, until the task is completed.
Did I mention tedium {grin}.
Once you have your first geoPaint work disk prepared, I recommend NOT doing all that again. The best procedure to follow is to backup this first geoPaint work disk, using something like Fast Hackem {any version}, using the fast copy feature. But remember, when you next work with GEOS, promptly rename all the work disks with a characteristic name such as GEOS64Paint-1Work. Well anything that makes sense to you and is up to 16 characters in length will be fine.First geoPaint Document
That is how I began using geoPaint. A lot of preparation and not much inspiration. Since I only had an MPS-801 printer I was restricted to sixty percent of the geoPaint page. I needed to figure out exactly where that was before trying to position any graphics or text. It took quite a few tests to establish this border line. Then with one of my geoPaint work disks I double clicked on geoPaint and I selected Create new document at the dialog box.
The journey into geoPaint began, learning about the tools from the tools menu, about updating the file, and about moving around the graphics I had drawn, and adding text in different fonts. When I needed to add some text, I had already chosen my fonts from those available on the system disk and FontPack1, and had them ready on my work disk. Only seven fonts can be accessed at a time so there was no point in having too many on the work disk. Four fonts was the number I chose to use after testing them for suitability. This work disk did not have a great deal of room on it anyway, starting with only 165K but somehow I survived. Although from my vantage point of the present I can not remember how. For more information about using geoPaint, refer to the sections on 'GeoPaint, Parts 1 and 2' in 'The World of GEOS Handbooks II and III' respectively.

A far far better thing

I was now totally hooked on GEOS and I had to know more. I bought GEOS64 v1.3 and I really liked the extra commands it made available. It was no longer enough. I had to have more. By mid 1989, the adventure into GEOS128v2.0 and 80columns was begun, along with using more

disk drives, and the purchase of GEOS64v2.0, a 1351 Mouse, and several other GEOS packages, and a 1750REU or two. I enjoy the additional commands and improved operation of v2.0, especially the multifile feature. My skills improved and GEOS kept pace with me and my equipment, and I was totally addicted. Naturally, I blame GEOS for all this need for equipment and programs. At least I never have to make work disks the old way anymore {grin}.The important thing to remember with GEOS is that it is not a race. GEOS will be there waiting for your skills and knowledge to grow. All you need is inspiration and perseverance. And the rest as they say is history. End, {or was it really the beginning ?}.

Since I first wrote this article in 1992, many things have changed in my GEOSing. With C128Ds, plus external 1571 drive, 512K RAM Units, a 1581 drive, and a SmartMouse, using 128-DualTop v3.0 {as my main system}, and a HandyScanner64 with PageFox on my C64, the World of GEOS is my oyster, so to speak.I enjoy myself in GEOS so much that I get withdrawal symptoms when I am out of it for too long. GEOS is 'the thinking persons play dough', well, that is what it is to me. I can mold it anyway I like, and make it do anything I like. Not bad for something that is supposed to be called 'work' {grin}. When I stop enjoying what I do, it will be time to hang up the mouse.

Readers Three Wishes And All That ...

From Ted Woodwell of Garran, ACT, "In one of our previous notes I was telling of the trouble I was having with the fonts jumping back after several pages, after converting Superscript128 to geoWrite128 with Text Grabber and reformatting the pages. Following your previous letter, I decided to have a look at some of my old GEOS disks and came across the WrongIsWrite one from some Q-Link down loads I had bought some time ago from the Christchurch User Group in NZ. This certainly solved my problem as it was easy to change fonts on all of the pages in the file at once instead of one page at a time. So at long last I have started on re-editing my story. With Perfect Print I can do 10 Pages of Page 1 at a time and as I am using single sheets, when finished just turn them over and print the page 2, 10 sheets on the other side, and so on. With Superscript128, I used tractor feed paper and printed odd numbers and then after about 20 pages turned the paper over and printed the even ones. I must say once you get organized this is much better. Still I have the rest of my life to get it done so I'm not in a hurry {JOKE !!}.

A photocopier would be nice, however I have a stack of paper that I bought for a song. Packets of it and good quality too.

Once again I must congratulate you on your excellent column. It's funny some of the names that keep coming up are like old friends although I have never met them, only their work. ...

I must have another look at geoPublish. I got it when I first sent away to the States [USA] for GEOSv2.0 and my GeoRAM back when they first came out. Other than doing the tutorial, its been in the box ever since I put it in the too hard box. I recently bought a box of software at a sale and there too was another unused set of geoPublish that I would be happy to pass on to any interested GEOS user. When I started doing our Newsletter I used Paint Pages to great effect for all my double column work so I never bothered to make the time to really have a look at the Pub. Now, with no deadlines now I must make the effort.

My oldest son ... has been visiting for the past week. ... He of course has been using IBM machines for some time, [he] had a look at what I was doing. when he saw some of my print outs of GEOS from Perfect Print, he couldn't believe it was from my old Citizen 9-pin. I was showing him some of geoCanvas which I am just getting to terms with. I will have a look at ScrapCan following your April column. Because I have been so busy this past year, some of the programs I have bought I have often had a glance at them, then put them by to look at later.

One program that I will get, as my son said to get it, is Joe Buckley's REU Zap [II]. On that German disk you showed me it was set up to dump the chosen Applications straight in to the RAM [Unit] on booting. I could do with that !!. Do you know whether it's on Storm Systems Disk I, or is it a stand alone program ?. I will send off a letter to the States [USA] this weekend. I have the address from your article.

Well cheerio for now. Keep up the good work, and I hope your health has improved".

Gg. Thanks Ted. Yes, REU Zap II is on the Storm Systems Disk I, along with many other programs and adequate geoWrite document files. You can also try the German distributor [Michael Renz of PPEurope] for this disk, if you get into difficulties trying to get it.

From Gordon Turrall of Warriewood NSW, "The GEOSgenie column is very informative and I enjoy it very much, especially the software and hardware reviews. Could you tell me

if your scanning service is still available, and if so what are the rates".

Gg. Thanks Gordon, I am glad to hear of the topics that you find interesting. Without this kind of feedback, it wouldn't be much of a column. The scanning service still operates, when people want things scanned. I have sent you the detailed information you require. I find it an exciting way of getting pictures / drawings into the Commodore and GEOS systems, and it never fails to amaze me with the things the HandyScanner64 can do, especially with PageFox {96K extra on a C64}. For more information, refer to the section 'The HandyScanner64 and PageFox' in 'GEOS in Review' HandBook.

Next month, will be another mystery out of the genies bottle !. Until then, happy GEOSing.

Send in your comments, or great GEOS discoveries, and I will respond when I can in this column, unless you wish a private reply, in which case please send a SSA{Business}E and I will write you back.

Special thanks to Rick Coleman {Photo Mover fame}, our USA GEnie BBS correspondent for your continued support, and to Michael Renz {Performance Peripherals Europe}, our German correspondent, for your continued support.

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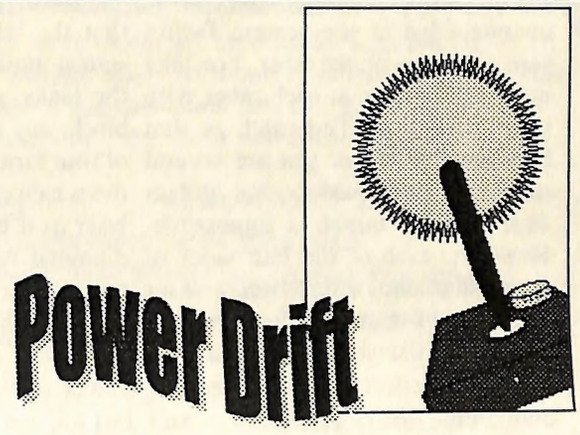
*{**} The World of GEOS HandBook Series {I, II, III}, GEOS in Review, and The HandBook of Commodore Disks are currently available from JMV Grafix*



November it is, and 1995 is fast slipping by. Those winter nights huddled around the fire are giving way to the humid evenings out on the beach, the hot chocolate is being replaced by the chilled can and the warm jumpers are being exchanged for the grass skirts and bamboo.

Well, almost. Commiserations to our northern readers as they head for the cold, but Down Under we're all pulling out the surfboards and eskies in preparation for summer. However, one thing remains the same throughout the year, come rain or shine, and that's the Commodore with a game in the drive!

All you gamesters out there can look forward to a new season full of entertainment as CN continues to bring you the latest developments from around the globe. As part of that commitment, we're going to look at one of the new products to emerge from American company Threshold Productions in this month's column - the strategy game Lazer Duel.

Just as many of the C64's old programmers are heading back to the scene to churn out exciting new demos, so too is the games area experiencing a revival in talent and enthusiasm. Lazer Duel is a testimony to the new feeling of optimism within our beloved community.

LAZER DUEL

With the cover depicting a mean-looking tank up on two wheels (or should that be one caterpillar track?) surrounded by laser beams, this program makes a good impression right from the start. The explanation of the background in the documents is a nice touch, with the age-old story being told in a simple time line. You know, big corporations develop wonder technology and raise their own personal armies, take over the world, end up fighting one another and causing a short-lived holocaust after which the few survivors decide that disputes should be resolved in a somewhat more civilised fashion (what ever happened to a good ol' arm wrestle?). In their quest for a device with minimal damage but still satisfying and enjoyable, these people stumble upon the former playing fields of the rich young executives which involved a pair of fusion- powered laser-equipped tanks doing their best to blast each other into pieces smaller than Kate Moss. And you guessed it, you happen to be the controller of a tank taking part in the Duel, and your task is to survive in such a way that your opponent doesn't.

The principle behind Lazer Duel is quite simple. You are a tank (and I mean that in a caring, sharing way)

on one edge of the screen, facing your opponent on the other. You take it in turns to fire at each other with your laser gun. The catch is that between the two of you are several diamonds positioned so that a clear shot at your target is impossible. However, each of the four sides of every diamond will reflect a laser beam at a 90 degree angle. The trick, then, is to fire your weapon so that the beam reflects off a number of diamonds in succession and ultimately hits your opponent... or you.

It should be made clear from the beginning that Lazer Duel is not a duck-and-dive shoot 'em up of the same genre as Cabal or Archon. Your tank remains in the position you left it after your shot and you sit there helpless as your computer opponent finds his range and selects his firing line. If he hits you, you can only plot his demise and attempt revenge (unless, of course, it was your last life). The key is not hand-eye coordination, but a tactical mind which can trace the potential path of your laser from diamond to diamond until you are reasonably sure that it will end up disintegrating your rival - or at least, not disintegrating you.

The real game is played before you press the fire button, and the enjoyable part to Lazer Duel lies in its absorbing strategy. Most of the walls are reflective as well, although there are a few blocks scattered around the screen which accept rather than reflect the laser beam and end your turn. In addition, there are two rotating light blue diamonds, one near the top of the screen and the other close to the bottom. When these bonuses are hit, you gain either 500 points, 1000 points or an extra life (you begin with the usual three). One of the exciting aspects of the game is that the laser trail remains on the screen until the beam strikes one of the tanks, a bonus or an absorbent block, any of which signals the end of your turn. This means that at times the screen can be criss-crossed by the laser as it bounces from diamond to diamond before eventually lashing out to hit something proper. A successful kill gives 1000 points, and at the end of each screen, after the player or the computer has lost the last life, the points are tallied.

GRAPHICS

Obviously in a game of this nature the graphics are not the primary focus of the play, but the artists - Terry Flynn, Zak Arntson and Patrick Vulpi - have done a good job to maintain the feel. Each screen remains static until one of the combatants triumphs and the other is vanquished, but the update after each shot when the randomly placed diamonds are scattered over the playing field in a different pattern is very quick in comparison to other games requiring a similar mechanism. Scrolling is not really an issue - the tanks simply move vertically in their little space when maneuvering for a shot on the opponent.

The laser beam runs easily and smoothly across the screen, and in general the game features surprisingly well-defined graphics which contribute to the overall positive impression.

SOUND

There is a suitably haunting title track which fits in with the mood of doom and gloom portrayed by the documents.

Lots of whining Steve Vai guitar solos and the like. The sound effects within the game are good - a satisfying "bounce" whenever the laser beam reflects off a diamond or a wall, appropriate blasting noises which accompany the firing of a shot, and the usual low growl of a tank in motion as you position your vehicle. Oh, and that's not to mention the lovely disintegration sound when your tank is blown into the printer sitting next to your monitor.

As you'll know by now, I normally grumble at a lack of ingame music, but strategy games of this genre are exempt from that taste. This is one where your own choice of music in the background probably works better than an attempt by the coding crew to cover all preferences.

GAMEPLAY

The big factor in any game, this is particularly so for all tactical games, and I believe that Lazer Duel passes the test reasonably well. Whilst the principal aspects of the game are the same throughout, there is enough variety in the smaller areas to keep it interesting and fresh. With eight levels, each has five different screens which, for those for whom maths was a struggle (I know how you feel), is forty-two screens in all. Or forty for those who never read, heard, saw or played The Hitch-hiker's Guide to the Galaxy. Each screen has its own distinctive pattern of permanent diamonds in some geometrically pleasing arrangement in addition to the twelve random diamonds, and thus the more common firing lines which you may be able to figure out by the end of one screen are absent on the next.

The different levels have their own background colours - first is red, second is green, third is light blue and so on to relieve your eyes whenever you advance. The later levels can be directly accessed from the title screen by pressing the corresponding number, but you must have previously reached your desired

stage in order to obtain the four-number code required for the short cut.

In general, I found that it takes too long to plot every twist and turn of the laser beam before each shot. Instead, I ended up ensuring that the beam was going to head in the basic direction to end up in a cluster of diamonds near your opponent in the hope that it would glance out and strike. This enabled me to keep the game going at a reasonable quick rate - the computer usually only takes a few seconds to line up and fire - and maintain the tempo.

Clearly, there are some for whom Lazer Duel will be worth spending many minutes planning each move... just call me impatient.

PRESENTATION

Lazer Duel came to me in a resealable bag with the five or six pages of documents folded around the disk - perfectly acceptable in this day and age where the punters tend to concentrate more on the game than the glitzy boxes which cost the producers a fortune. The cover had a couple of screenshots printed out on waxed paper giving an accurate portrayal of the software with scenes from the first level. On the title screen a small tank scrolls up the side of the screen and fires a few words across to form the level selection query - a nice touch from the coders.

Threshold Productions have done well to support and market their product in a positive manner and this attitude comes across in the presentation.

OVERALL

One thing is certain about this game - Lazer Duel is definitely one for some and not others. A few friends who looked in on me during the review period were divided as to their opinions; some were enthusiastic and had to be forcibly removed from the computer, whereas others afforded it one look and then moved on. I suspect that those who delight in shoot 'em ups should pass this over, but I am convinced that those who enjoy a tactical game with a difference will gain much enjoyment from Lazer Duel.

With respectable graphics and sound, the gameplay offers enough depth to make this one worth a second or third look.

- ◊ **Graphics: 80%**
- ◊ **Sound: 74%**
- ◊ **Gameplay: 84%**
- ◊ **Overall: 81%**

COMPETITION

As always, The Power Drift gives you the chance to try for yourself the games reviewed in the column. Up for grabs this month is a copy of Lazer Duel, which can be all yours if you find the correct answer to the following question: How many points are awarded for a successful kill? So simple even your pets could enter - and they can, if they like! Send your entries to:

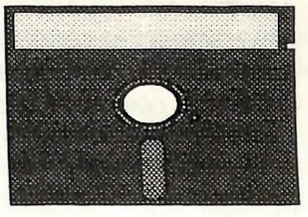
The Power Drift
PO Box 123
Walkerville SA 5081

I'll be awaiting the sea of mail with trepidation...

COMING SOON...

And thus concludes the review of Lazer Duel - but never fear. The Power Drift shall return soon. Next month we'll be looking at another of Threshold Productions' offerings: Slaterman. A case of platform game meets smash'n'grab, hang around to see whether or not it outscores its partner in the coming review. Until then, look after yourselves and I'll be back by your computer desk in no time at all.

Cheers Andrew



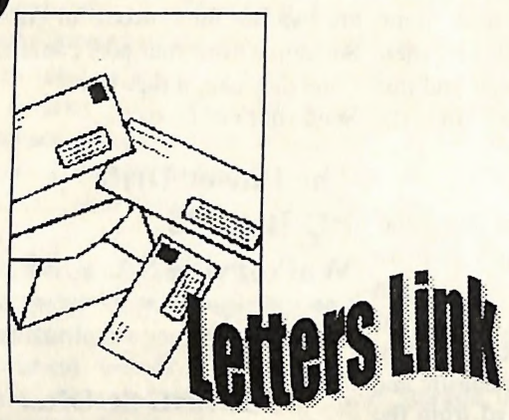
JMV GRAFIX

The Handbook of Commodore Disks	$15
The Handbook of Commodore 128	$15
The Handbook of Commodore 64	$15
The World of Geos Handbook	$15
The World of Geos Handbook II	$15
The World of Geos Handbook III	$15
Geos in Review	$10

Prices include Postage and Handling within Australia, and are quoted in $A. Overseas orders please add $A5.00

JMV Grafix PO Box 635, Blair Athol, South Australia, 5084

Commodore Network



POINTS IN SEPTEMBER C.N.

p9: Simple RS232 User Port Interface :

certainly should perform voltage level translation for signals to the computer, but provides only a 0V/+5V excursion for data into the modem. This is outside the RS232 specification, and while some modems will use such a signal, many will not. It seems appropriate to warn intending constructors that AUSTEL (the regulatory authority) provides heavy penalties for breaches of its regulations concerning the use of such an item, to protect both the user and the telecommunications equipment to which it connects (through the modem). Those interested should peruse page 21 of "Electronics Australia", November 1995.

p11 : 1571 Drive Speed :

No wonder the speed adjuster couldn't be found! There is none. Unlike the 1541, the disk in the 1571 is driven by a stepper motor which receives pulses counted down from a crystal-clock source. In Vic Majury's case, with two drives indicated as slow, I would be very suspicious of the test method. It is possible that Drive Doctor's testing is timed from a slower time-base in his computer (perhaps 50 Hz) than envisaged by its designer, more used to US conditions (60 Hz).

Probably his OK drive really is, with the other having some problem not related to drive speed.

p12 : Care With Electricity :

While fully supporting Vic Mobbs' plea for ELCB's (Earth Leakage Circuit Breakers), I must point out that his fire would almost certainly have progressed in the same way even if he had had an ELCB.

Overheating in a plug is due to current traversing extra resistance in its normal path, but the ELCB only acts on current in an abnormal path ie. via earth.

An ELCB could have cut off the electricity, but only after the fire had advanced so far as to burn away the insulation and allow the extension cord's conductors to contact each other.

I note that he did not mention a smoke alarm, which could have produced a quicker alert than his nose. They should have even greater priority than ELCB's, having the potential for saving more lives.

Thanks for the above information, Gordon.

SUPPLY of DISKS

And from Vic Mobbs, now residing in Victoria, comes this:

Did you know that it is extremely difficult to get Double Sided Double Density disks (either size) outside the capital cities?

It is getting extremely difficult to reliably locate Double-density disks (either 5.25" or 3.5") anywhere at what can be construed as a reasonable price. C.N. has recently located a new source, and will be offering blank disks through C.N.P.D. (see flyer in the last issue).

HIGH DENSITY DISK DRIVE for C128

Vic goes on to say:

Is there any chance of this happening?

Yes, in fact both of CMD's FD drives (FD-2000 and FD-4000) can handle High-Density disks.

HELP LINE

Further in to Vic's letter he wrote:I really like talking to people over the 'phone but few if ever try me. There are many times I am frustrated by a program on disk or page with no HELP line available.

If the people who produce the disk or write the article don't want to talk or write to people, maybe they could be persuaded to send ALL details to me so that I can do that for them.

Nothing ventured, nothing gained they say. Failing that, I think readers would welcome the choice to have a 'CN-Buddy in the same telephone

district' to whom they may more conveniently relate where HELP is an appropriate solution to some frustrating computer problem.

The Club in Sydney who tried it, found that membership & readership grew.

HelpLine was a very successful innovation in the earlier issues of C.N. It's disappearance was not because our "HelpLiners" were no longer available. It was more a combination of editorial carelessness, when, after a couple of "jam-packed" issues where it became expedient to drop the item due to space limitations, its re-insertion was simply forgotten.

Let's see if we can't get it right this time and insert a few HelpLiners names in this edition. hopefully it will become a regular item once more within the pages of C.N.

As for the suggestion of a "CN-Buddy", I think it's a great idea, although in practice it may not be possible since our readership is so widespread. However, if anyone would like to be a "CN-Buddy" let me know. If we don't try, we'll never know!

COMMODORE FORMAT

Up in New South Wales, and Marc Walters writes:

The rumour that Commodore Format magazine is no longer with us is not quite true. I inquired at the Australian magazine distributors, Gordon & Gotch PTY LTD, who told me that the last CF to reach Australian shores was the May 1995 edition, further issues were not exported from the U.K.

I then rang Future Publishing in Britain, who said that CF was still being published, but apparently not being exported.

A few days ago I read in a disk magazine that next month's issue of CF was to be the last ever (either the October or the November issue).

As for CF's sister magazine Amstrad Action, it was closed after the July 1995 issue (#115), leaving CF the last remaining commercial 8-bit magazine in Britain.

Hmmm, (Warren in his best Mike Moore voice) interesting news, Marc. It verifies and explains several things that I've been told by sources overseas.

SOFTWARE SOURCE

Marc goes on to say in his letter:

At the recent annual Newcastle Microcomputer Exhibition I found one exhibitor from Sydney who claimed to have a few thousand units of C64 software sitting in his warehouse. Wow!

A few days later I was sent their catalogue:

* **CLOVER PARTNERS**
* **discount software**
* **P.O. Box 971**
* **Lane Cove**
* **N.S.W. 2066**

Although mainly cassette based, their range of software is large, and has quite a number of excellent titles and old classics. all are priced at $5 each.Some of their better titles include:

DISK: Blood Money, Chessmaster 2100, Mavis Beacon Typing Tutor, Build-a-Book refill kits #1 and #2. Switchblade, and Warlock

TAPE: Chart Attack Compilation. Now Games 5 Compilation, Cloud kingdoms, Eye of Horus, Fighting Warrior (only 876 units remaining!!! I bet they really want to get rid of these!), Hero Quest, Rainbow Arts 5th Anniversary, Rainbow Arts Action Pack, Rodland, Scrabble Deluxe, and Shoot-em-up Construction Kit.

As you can see, mostly tape, but many are single load and so are transferable to disk via Action Replay type cartridges. The full list contains 51 different titles.

Clover also deals in software for most other computers.

Great stuff, Marc. I for one will be contacting Clover if only to see what they have to offer.

BUYING A PRINTER

Back down to Portland, Victoria, and Ross Galbraith writes:

I'm thinking of buying a new printer for my children's C64. Even though the main use of the unit is still games, both are now at an age where wordprocessing (for homework, etc.) skills and the ability to print out files would be an advantage.

I have been told that the majority of printers now manufactured are for use with the IBM computers (or compatible). Will I need to buy second hand, or are there suitable new printers readily available?

If I can get a printer, what should I look for? What do you consider the features of most use?

OK, Ross, first things first. Most printers currently being marketed

can be used by your Commodore with the right connections. It doesn't matter whether it's a 9-pin dot matrix or the latest state-of-the-art laser. I use a Panasonic KX-P4410 laser connected up to my C128 via a GeoCable for all my needs, and it works perfectly with GEOS, The Write Stuff, and Superscript/Superbase. It will pay you to look for Epson compatibility in any printer you purchase. As for features, well I can't say that I've ever found any particular feature to be as important as output quality. If the text/graphics print out to your satisfaction, you can then consider the additional features each printer provides. Be aware that many features may be unavailable to you, depending on the software being used at the time.

F-14 TOMCAT

Peter Rose of Port Moresby, Papua New Guinea, writes:

I'm not too sure where I should send this, so I'm sending it to Letter's Link. If it should be passed on to "Power Drift" then I'll leave that to you, Warren.

For a long time I had trouble with the early flight training tests. I used to try and follow the instructor but now, by learning the hard way, I've found an easier method. All you need do is follow the arrows being displayed in the lower left corner of the screen. They become illuminated, indicating the direction you should go in next.

I suppose I really should have passed this on to Andrew, but what the hey!

Micro Mart

FOR SALE

1 Commodore 64C, slimline case, excellent condition including manual, power supply and video cable... $60

1 Maestro 2400 ZXR modem complete with manual and power supply, allows 300, 1200/75, 1200 and 2400 baud transfer, fully automatic and software controlled, battery-backed RAM... $99

CONTACT:
Andrew Gormly
PO Box 123
Walkerville SA 5081

FOR SALE

The Following Copies of Commodore magazines at 50 cents each, plus postage.

Your Commodore C16/Plus 4 - November '88

RUN - March '88

Commodore Magazine - December '84, January '87, August '88, December '88, March '89

Commodore User - December '87, January '88, April '88, May '88, November '88

Your Commodore - May '87, July '87, April '88, August '88

Zzap 64 - October '88, November '88, December '88, March '88

Commodore Computing International - April '88, August '88, September '88, October '88, January '89

Compute! - May '84, March '85, April '85, May '85, August '85, September '85, November '85, December '85, January '86, March '86, August '87

Compute Gazette - July '84, September '84, October '84, April '85, June '85, September '85, October '85, November '85, December '85, January '86, July '87, August '87, March '88, November '88, March '89

CONTACT:
Gordon Screen
18 Windsor St.
Edgeworth N.S.W. 2285

FOR SALE

Mini Office II - original, boxed, with manual - $35 + postChessmaster 2000 - original, unused, boxed, with manual - $30 + post will send COD

CONTACT:
Bill Bratby
27 Smith St.
Old Bar
N.S.W. 2430
Ph: (065) 537 540

Commodore Network

FOR SALE/SWAP

Microsoft Multiplan 64 with docswilling to consider any swap or offer

CONTACT
Aaron Kernbach
P.O. Box 927
Nairne S.A. 5252
Ph: (08) 388 0014

FOR SALE

Easyscript 64 - disk and manual
$25.00

Simon's Basic- cartridge and manual
$25.00

Epyx Fastload - cartridge and docs
$25.00

128 Programmer's Reference Guide
$30.00

Commodore Disk User (11 mags and disks) plus Serious User's Guide for '87 and '88
$30.00

All prices include post and packing

CONTACT
Ron Daniels
2/1 Dennis Place
Victor Harbor S.A. 5211

FOR SALE

Commodore 64 (slimline) with 1541 - II disk drive, 1201 monitor, 9-pin dot matrix printer, AVTEK fax/modem,"Freeze Machine" fastload/backup/reset cartridge, RS-232 cartridge, around 100 double-sided disks of 64 software, heaps of docs, including the first three years of C.N., Programmer's manuals, bound Commodore Hacking mags, original software titles on disk and cassette, joypad, all cables and power bricks . . ..and much more! $400 ono

CONTACT:
David Wolfe
Lower Plenty
(03) 9432-8407

FOR SALE

GEOS 128 (complete and boxed)
$25.00

GEOS 64 V2.0
$25.00

GeoCalc 64
$15.00

GeoPublish 64
$25.00

Jane 128 (40 cols), boxed
$10.00

Font Master II 128 (boxed & complete)
$25.00

Warp speed 64/128 (cartridge)
$30.00

Expert V4.1R cartridge, complete
$30.00

C64 Programmer's Reference Guide
$20.00

Superbase: the Book
$10.00

Trivial Pursuit (Baby Boomer edition)
$10.00

Jordan vs Bird
$10.00

Teenage Mutant Ninja Turtles
$10.00

Supremacy (Space strategy simulation)
$20.00

Sim City
$20.00

Pool of Radiance
$20.00

Cave Ugh-lympics
$10.00

Word writer 4
$15.00

Super Expander Cartridge
$10.00

Partner 64
$15.00

All software is original and has manualsPayment COD include postage

CONTACT:
Eddy on (0848) 33165

FOR SALE

REU UPGRADE - done by Lance Bosanquet from McGrath's Hill.

The REU will run under GateWay (without switcher). It registers 952k on RAMDisk $300.00

GateWay 128 $25.00
Battery Backup $130.00
KeyDOS $30.00
128 News Maker $30.00
128 Sketch Pad $30.00
128 Spectrum (paint programs) $30.00

The three programs above are suitable for use with the REU.

128 Illustrator $20.00

Note: the above is unsuitable for use with the aforementioned REU.

CONTACT:
Gwen Lohman
130 Crooked Lane
North Richmond N.S.W. 2754
Ph: (045) 711 762

WANTED

Colour monitor for the C= 64

CONTACT
Bob Cole
Ph (079) 563 415

WANTED

Australian Commodore and Amiga Review back issues

CONTACT
Andrew Leniart
(018) 326 012
E-mail: aleniart@netspace.net.au

Basic Magic

Large Sequential text files can sometimes be a problem. Some text files, when transferred from a larger machine such as a PC, can be hundreds of blocks in length. It may be necessary to divide the file into a number of smaller text files of a size that your wordprocessor can more easily digest.

This task is easier than it sounds, as we need only to use BASIC 2.0's built in file handling capabilities to do the job.In brief, an input channel is opened for the large sequential text file, and an output channel opened for the new, smaller series of text files which will be produced.

The OPEN command is used for the task, for example-OPEN 2,8,2,"BIG TEXT FILE,S,R" opens channel 2 for the file "BIG TEXT FILE". The "S" is the file type ("S"=Sequential, "P"=Program, etc.) and the "R" is the operation type, in this case a "read file".

ASCII characters are read from the file one at a time, and can be printed to the screen or output to another OPENed file. The reserved variable, ST, is used by the operating system as a status flag, when read it will return a value of zero unless the end of a file is reached or a disk error occurs.

To use the following program: At the "FROM" prompt type the name of the large text file needed to be broken down. At the "TO" prompt type the destination filename. Each new file will have a successive number appended to its filename.At the "BLOCKS" prompt, type the maximum number of disk blocks you wish each destination file to be, a disk block is about 254 characters in size, or one quarter of a kilobyte.

EXAMPLE:

A 120 Block text file, "INSTRUCTIONS", will not fit in a particular Word Processor. It needs to be broken down into files of no more than 50 blocks in size.

At the "FROM" prompt type "INSTRUCTIONS" <return>, at the "TO" prompt type "I.PART" <return>, and at the "BLOCKS" prompt type 50 <return>. Make sure a disk containing the file and enough free blocks is in device #8 (diskdrive).

The filename of each new smaller text file created is printed to the screen, and the text saved in that file is printed as well.The program will create three new text files on the disk named "I.PART 1", "I.PART 2" and "I.PART 3", none of which are greater than 50 blocks in length.When typing in the program, the spaces between commands may be omitted. This program will work also on the PET, C16, Plus4, C128, and C65 in C64 mode (probably).

```
100 INPUT "[CLEAR]FROM" ; F$ :
INPUT "TO" ; T$ : INPUT "BLOCKS" ; B
: EN=0 : NT=0 : PRINT CHR$(14)

110 FF$ = "0:" + F$ + ",S,R" : OPEN
2,8,2,FF$ : GOTO 200

120 NT=NT+1 : TT$ = "@0:" + T$ +
STR$(NT) + ",S,W"

130 OPEN 3,8,3,TT$ : BC=0

140 GET# 2,A$ : PRINT A$; : IF ST <> 0
THEN EN=1

150 PRINT# 3,A$; : IF EN=1 THEN
CLOSE 2 : CLOSE 3 : PRINT : PRINT
"***[ FINISHED! ]***" : END

160 BC = BC+1 : IF BC < 254*B THEN
140

170 CLOSE3200 PRINT
"[DOWN][DOWN][DOWN][DOWN][DOW
N]" : PRINT "***[ SAVING: " ; T$ ; NT+1 ;
"]***" : PRINT "[DOWN][DOWN][DOWN]"
: GOTO120
```

Explanation:

LINE 100: variable EN will be set to 1 if end of file is found. Variable NT keeps a count of the number of new files created. "PRINT CHR$(14)" turns on Lower Case mode.

LINE 110: String Variable FF$ is created for use by the OPEN command.

LINE 120: String Variable TT$ is created, note the use of variable NT to form successive filenames.

LINE 130: The output channel is OPENed. Variable BC is initialised and will be used to count up to 253 ASCII characters.

LINE 140: A character is fetched from the input channel, printed to the screen, checked to see whether the end of the file is reached.

LINE 150: The character is sent to the output channel, and, if it was the final character, the files are closed, the program ends.

LINES 160, 70 and 180: The character counter is increased. A block is treated as 253 characters. If the maximum number of blocks is not reached then the program loops, otherwise the current output file is closed, a message printed, and the program loops back to create a new output file.

NOTES:The program only recognises device 8. The program does not convert ASCII to/from PETASCII. To save a BASIC program as a text file type in

OPEN 2,8,2,"filename,S,W":CMD2<RETURN>

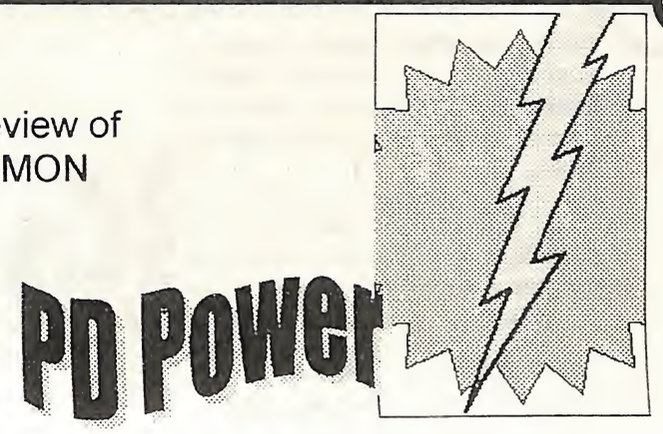
then LIST<return>,

then PRINT#2:CLOSE2<return>.

Control codes within quotes such as <cursor down>, <home>, <Reverse>, etc. are ignored.To handle the control codes rewrite the program so that each control code is individually handled and a relevant string output in its place, for example, if the control code for <cursor down> is input, the program should output "[", "D", "O", "W", "N", and "]", or a similar substitution.

EDITOR'S NOTE: This program will appear on the next Disk-Coverer

A Review of CSMON



CSMON is a machine language monitor developed by Polynious of the European demo team Padua.

The monitor is certainly superior to most other ML monitors available, for the following reasons:

1) It allows use of undocumented/illegal opcodes like LAX, LAY, STP, etc.

2) Very user friendly- uses colour coded information fields, dividers after JMP opcodes in a disassembly, and a well implemented set of monitor commands.

3) Uses the Software Break Vector the way it should be used.CSMON resides in the standard $C000-$CFFF area.

There are 22 single-character commands. In the following list whenever parameters are needed, xxxx indicates a single starting address in hexadecimal is required, such as in a Disassemble command, while <start> and <end> indicate a range of addresses, such as in a Save or Hunt command.

Other important parameters such as <byte> are indicated within "<>" symbols.

X: Exit. SYS 49152 or STOP/RESTORE to reenter the monitor.

R: List 6510 registers on entry.D xxxx: Disassemble code from xxxx.D: Disassemble code starting from previous line.

M xxxx: Memory dump from xxxx.M: Memory dump starting from previous line.ESCAPE (LEFT ARROW KEY): Cycle through memory map configurations-location $01 cycles through $30 to $37.:: Set Bytes. e.g. : xxxx 00 01 01 00 ff]: Set ASCII pattern. e.g. [xxxx "Read Me!".<: Set screencode pattern. E.g. < xxxx "Read Me".

F: Fill area of memory. E.g. F <start> <end+1> <byte>.

T: Transfer memory. E.g. T <start> <end> <destination> Overlapping transfers are handled properly.:: Assemble code. E.g. : xxxx LDA #$00.A xxxx. Assemble code from indicated address.

J xxxx: Jump to routine. If the routine ends with RTS, control is handed back to the monitor. If a BRK ends the routine a Software Break occurs and default colours are set before control is handed back to the monitor.

I xxxx: Interrogate memory from

xxxx.I: Interrogate memory starting from previous line.@: DOS command. E.g. @ reads the error channel, @$ loads a directory to the screen.

L: Load file. L "filename",<device>,xxxx. E.g. L "Routine V6",08,1000 will load the file to location $1000.

S: Save memory. S "filename",<device>,<start>,<end+1>. E.g. S "Routine V7",08,1000,2000 will save memory from $1000 to $1FFF to device #8 under the filename "Routine V7.

H: Hunt for byte pattern. H <start>,(end+1),<byte>,<optional byte>..... Up to two lines of bytes can be entered for the search.

$: Convert Hexadecimal to Decimal and Binary. E.g. $ A, E.g. $ 10B.K: Memory dump and Interrogation of I/O and Jump Vector areas $D000-$D02F, $DC00-$DC0F, $DD00-$DD0F, $0300-$0337.P: List all commands.

*: Unknown command. Hmmm, it seems its only use is to crash the monitor?

I would prefer having CSMON residing in my Action Replay cartridge rather than the one supplied, and the fact that CSMON is software based is the only factor detracting from its appeal and utility value. If you have a cartridge based assembler, keep using it, if not, or you like to experiment with illegal opcodes, then check out CSMON, it is an excellent addition to any programmer's utility collection, and is probably the best Machine Language monitor currently available for the Commodore 64.

Showcase

64Net

To the owners and users of both a PC and a Commodore 8-bit machine, the incompatibility of the two separate systems has always been a frustrating point.

Why should thousands of dollars be spent on an imported C64 hard drive when there are megabytes of storage space lying idle within the PC?

Why is it necessary to hunt through hundreds of trading post advertisements to find a second-hand 1581 drive whilst the 3.5" drive on the PC simply gathers dust?

If you've ever asked such a question, then a new product from South Australia is emerging which can solve all of these problems and do much more.

64NET, the brainchild of Paul Gardner-Stephen, is a hardware-software package which connects a Commodore 8-bit computer to a PC and allows the former machine to utilise the peripherals of its counterpart - hard drives, floppy drives, and even printers.

The basic premise behind 64NET is a simple one: the two systems are connected by a custom cable and each runs a small program to access the interface.

The installation of the cable is a relatively easy matter, achieved by connecting it to a printer port on the PC and the user port on the Commodore. The next step is to prepare the server program on the PC.

A menu-driven installation program is easy to use, and once this is completed a configuration menu is displayed. This enables the user to select or ignore options such as burst loading, a setting which increases the load speed on a 128 or - if you are one of an elite group - a C65, and virtual mount, which allows the GEOS system to access a collection of disk images from a device such as a CD-ROM as though they were present on a RAMLink, a RAMDrive or a CMD hard drive.

Throughout the configuration program, a bottom ruler enables quick reference to the necessary commands.

One point to remember is to press "s" in order to save the changes made for the particular system, as otherwise the program will revert to its default settings.

After the program has been configured, it progresses to the main screen which is split up into a number of different windows,

displaying items including Status, Current Operations, Registration, and a larger box which can show DOS messages, System Performance, User Status, User Directories, Client Types and Mounted Volumes.

This can be left on to monitor the operation of the link, or it can berun in the background as another person uses the PC for their own ends whilst the Commodore user accesses the peripherals.

Once the server program has been established on the PC, the third part of the interface is brought into play by turning to the Commodore and loading a wedge called 64NET* which brings up a screen similar to that of the normal BASIC system. This allows the user to assign a device number to the PC's hard drive, or any of its floppy drives.

From here any material can be transferred between the two machines - Commodore programs can be stored on the hard disk of the PC and accessed without needing to transfer them back to a Commodore disk.

Similarly, printing can be done from a program on one computer to a printer connected to the other, saving the time and space required to move such an often large peripheral. The program is a type of IRC clone, and a simple BASIC routine can be entered which will divert the Commodore directly to the 64NET screen when it is turned on.

GEOS

Of course, one area in which this product will create a great deal of interest is that of GEOS. In order to run GEOS in tandem with 64NET an REU is required and the GEOS disk must be prepared beforehand by adding to it a number of 64NET drivers.

A new partition on the hard disk can then be created - however, it must be similar to the size of either a 1541, 1571 or 1581 disk.

The mere prospect of suddenly having an entire 240 megabyte hard drive at its disposal is sadly too much for the average GEOS desktop to handle.

One of the most notable benefits of such a system can be measured in terms of speed. For example, GEOpaint pages accessed directly from the hard disk take less than a second for a full screen 8K page to load.

Whilst such phenomenal increases in speed are decreased when the server program on the PC is being run in the background, they are still of such an extreme order to bring a huge smile to the face of many a painting enthusiast.

For the more technically minded, the transfer of data from a PC hard drive to a straight C64 is somewhere in the region of 10K characters per second, and this increases even further on a C128 or C65, which can interface at up to 26K characters per second.

64NET is definitely a major breakthrough for owners of both a Commodore and a PC,enabling them to maximise the usage of their peripherals.

An easy, cheap alternative to international mail orders, it allows users to reap the speed and accessibility benefits of hard drive storage whilst also improving space efficiency.

Not all non-GEOS software will work on the current beta-version,but the serial version coming soon will greatly increase compatibility.

Paul Gardner-Stephen has created a very slick package using his local talents, and at less than $100 this should one of the best-selling Australian Commodore products of all time.

The PD version can be picked up off most Bulletin Boards or from C.N.P.D. Registered and/or the latest versions can be obtained from the following sources:

Paul Gardner-Stephen
1 Hurst St.
Morphettville
S.A. 5043

Russell Alphey
439 Punt Rd
Richmond
Vic. 3121

EUROPE
Performance Peripherals
Sorry, no address available at time of going to press.

Online Support

Sydney

Way Out West 02 9628 8888
Space Station 047 742 252

Melbourne

GeoZ 03 9803 6498
Talisman 059 444 061

Fishbowl

Pinnacle

Adelaide

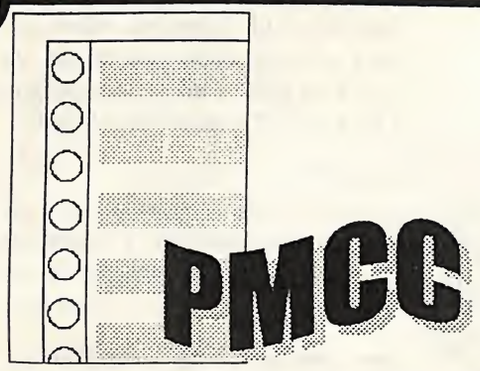
08 277 1361

Brisbane

07 3341 9560

All BBS systems are 24 hour access

Commodore Network



FLPT MATH

Editor's Note: *In Marc's own words, this is a MONSTER article. It is, however, probably the most thoroughly documented article on the use of the BASIC ROM floating point math routines ever attempted and, as such, deserved inclusion in its entirety within a single issue. the article lists EVERY major ROM math routine, including ALL entry points, and is, I'm assured, completely error free. It should prove an invaluable reference source for ML programmers on the Commodore 64.*

The C64's BASIC is limited, which is one of the reasons why many of us have had to resort to learning machine code. The lack of graphics commands reduces any program that uses bitmap mode to a crawl, due to the mass of POKES, PEEKS and formulae needed to just plot single pixels to the screen.

Most BASIC graphics extensions allow BASIC to pass parameters such as COLOUR and X/Y coordinates to a machine code routine which then does all the hard work of calculating and drawing.

The simplest way to pass these parameters to a machine code routine is via the SYS command. You've probably come across this sort of thing - SYS 49152,A,B. Well, the machine code routine at 49152 ($C000) uses the BASIC Interpreter's own routines to convert the supplied parameters (variables A and B in this example) into something your own MC routine can handle.

Here's how it's done- The SYS call passes control to your machine code routine. A reserved Zero-Page pointer at $7A/$7B, named TXTPTR, contains the address of the current byte of BASIC program text (at this point, the "2" in "SYS 49152"). There are two ROM routines we can use here, one at $AEFD which increases TXTPTR and checks for a comma, and one at $B79E which increases TXTPTR and evaluates a numeric expression which is in the range 0-255 then puts it into the X-register. It just so happens that near the end of another ROM routine, at $B7F1, the instructions JSR $AEFD:JMP $B79E occurs, saving us some typing.

Providing that the two parameters are always integers between 0 and 255 our routine at 49152 might start off with something like this:

```
JSR $B7F1
STX NUMBER1
JSR $B7F1
STX NUMBER2
```

...If a parameter needs to be a larger 2-byte integer (between 0 and 65535) then the following code is needed-

```
JSR $AEFD ;skip comma

JSR $AD8A ;Evaluate numeric expression, then put it into floating point accumulator #1.

JSR $B7F7 ;Convert the number in the flpt accumulator to a 2-byte integer in $14/$15 and (A/Y).
```

And that's that! After using the numbers to plot a pixel or whatever, a simple RTS will return control to BASIC which will continue onto the next BASIC instruction after the SYS. But what was that floating point accumulator thingie I mentioned?

FLOATING POINT MATHEMATICS

Some of the most underutilised features of the 64's operating system are its floating point (flpt) mathematics routines. These ROM-based routines give reasonably accurate results and are easy to use although suffer from being a bit slow.

There will be times when accurate floating point mathematics operations are preferable over faster but less accurate integer-based routines, or the use of memory consuming precalculated data tables.

For example, the ROM based flpt routines could be used for multiple math operations where fractions will be produced, the scaling of graph coordinates, or programs requiring a text screen display in which double precision numbers are needed (currencies, temperatures, etc.).

Another use could be to generate precalculated sine tables for use in demos and games. In previous programming columns we have used BASIC programs (yuerck!) to

generate sine tables, but never again! Hurrah!

THE FLOATING POINT ACCUMULATORS

The BASIC interpreter uses two Floating Point Accumulators (fac) residing in Zero-Page RAM for all of its math operations. The results of calculations are stored in the first fac (FAC#1).

Where two numbers are used in an operation, such as division, both facs are used. Each fac consists of 6 bytes of ZP RAM, the first byte holds the exponent, the next 4 the mantissa, and last byte the sign.

FAC#1 resides at $61-$66, the functionally identical FAC#2 is at $69-$6E. All major ROM routines and reserved Zero-Page memory locations in the C64 have names of no more than six characters, conforming to the MOS Technologies 6502 Assembler label specifications.

You may be familiar with some of the more common Kernal routine labels ($FFD2=CHROUT, $FF9F=SCNKEY, etc.), and it's no different way back down in Zero-Page.

FAC#1 is referred to in most textbooks as "Bruce", er, I mean FAC (I really should get out more often) and FAC#2 is referred to as ARG.

The three parts of the facs also have names, the exponent, mantissa and sign of FAC are named, respectively, FACEXP, FACHO and FACSGN. ARG is similar- ARGEXP, ARGHO and ARGSGN.

The six individual bytes in FACHO and ARGHO are suffixed with a number, e.g. FACHO1, FACHO2, etc.

Okay, the next section is for those masochists who want to know more about the format of a flpt number in the facs. It's not really essential to know because only the ROM math routines need to work with numbers that are in flpt format.

A flpt number comprises 3 parts: Mantissa , Exponent and Sign. The mantissa is the "normalised" value (between 1.00000 and 1.99999). The exponent is a power of 2. When the mantissa is multiplied by 2 raised to the power of the exponent the result is the actual value of the flpt number. The sign is indicated by a #$00 if positive, a #$FF if negative. For example, the actual value 8 would have a fac format of 1.00000 for the mantissa, an exponent value of 3 and sign would be 0, thus 2*2*2*1.00000 = 8(unsigned).

In order to take into account negative numbers #$81 is added to the value in FACEXP. #$80 represents 0, #$81 (2 to the power of 0) = 1, #$82 (2 to the power of 1) = 2, #$7F (-2 to the power of 0) = -1, etc. When the value in FACEXP indicates a zero number (#$80) the mantissa and sign are ignored by the BASIC interpreter.*

Non-computer nerds can rejoin us at this point. To recap, FAC resides in the 6 Zero-Page bytes from $61-$66. $61 holds the exponent (FACEXP), $62-$65 the mantissa (FACHO) and $66 the sign (FACSGN). ARG, also known as ARG, is located from $69-$6E. The format of ARG is the same as that for FAC. ARGEXP=$69, ARGHO=$6A-$6D and ARGSGN=$6E.

Most of the BASIC ROM routines are self contained and have multiple points of entry. Take, for example, a BASIC line such as 10 A=SIN(V). The BASIC Interpreter has to place the value of the variable V into FAC, call the SINE routine at $E26B which will place the result of the operation into FAC, after which the value will be placed into the variable V.

So, if in our own machine code program we can somehow put a flpt number into FAC, all we then have to do is call $E26B to calculate the SINE of that number.

PUTTING A NUMBER INTO FAC

To put a number into FAC we must first provide the number in a format recognisable by one of the BASIC interpreter flpt conversion routines.

There are some methods we can use to put a number into FAC. The first method is to provide an ASCII text string, such as "4.831", by changing the TXTPTR vector at $7A-$7B to point to the first byte in RAM of the ASCII text and then calling $BCF3, which converts the text to a number in FAC.

The second method is to load the Accumulator (A) and Y register (Y) with a (hi/lo format) two byte signed integer and call $B391, which converts the integer to a flpt number in FAC.

The signed integer ranges from -32768 to 32767, an actual 2 byte value between 0-32767 will be positive, a value greater than 32767 ($7FFF) will be negative, so the value 65535 ($FFFF) will, when considered as a signed integer be equal to -1.

The third method is similar, load the accumulator with a one byte signed integer ($7F=127, $80=-128, $FE=-

2, etc.) and call $BC3C to have the number converted into a flpt value in FAC.

The fourth method is to have a flpt number in the 5-byte BASIC variable format (a "floating point variable") stored in RAM and a call to $BBA2 to decompact and restore the flpt variable to the FAC.

This last method won't be of much use except to recall temporarily stored flpt numbers back to the FAC, or load one of the reserved flpt constants located in various areas of ROM.

The BASIC Interpreter's math and flpt handling routines are multipurpose, and a single routine may have several entry points, each used by different parts of the interpreter. As long as the entry requirements are met (preloaded registers and Zero-Page locations) then the routines will work fine when used by our own programs.

Operations such as addition and multiplication need both facs, plus some simple setups before the operation is called. ARG is the fac that math operations act on. For example, during a division, the number in ARG would be divided by the number in FAC and the result, as always, will be placed in FAC.

For operations that use both facs, such as +,-,* and /, the following setup must be carried out-1) The Sign Comparison flag at $6F (ARISGN) must be set by EORing the two facs' signs.

EXAMPLE:

```
LDA $66:
EOR $6E:
STA $6F.2
```

(A) must be loaded with FAC exponent.

EXAMPLE:

LDA $61. This setup is required because entry points several instructions past the beginning of the ROM math routines are used. Let's examine the first part of one of these math routines - the division routine:

$BAFE (DIV10): Divide FAC by 10 This routine copies FAC into ARG, sets up pointers to the flpt constant in ROM and enters the following divide routine.

JSR $BC0C ;copy FAC to ARGLDA #

$F9LDY #$BA ;$BAF9=ROM location of flpt constant 10

LDX #$00 ;sign comparison result * * * * * * * *

$BB07 (FDIV): Divide ARG by the flpt number at the address pointed to by (A/Y) FAC = ARG/flpt constant at (A/Y). On entry A/Y (lo/hi) must point to a flpt variable and (X) hold the sign comparison result byte. The flpt variable is then loaded into FAC using a routine at $BBA2, then the main divide routine entered.

STX $6F

JSR $BBA2

JMP $BB12* * * * * * * *

$BB0F (FDIVT): Perform divide

FAC=flpt constant at (A/Y)/FAC. On entry (A) must hold FACEXP (LDA $61). The sign comparison result (ARISGN at $6F) should also be set up on entry.

JSR $BA8C ;Load ARG with flpt at (A/Y)

$BB12: This is the main entry point.

FAC=ARG/FACBEQ $BB8A ;check for division by zero error.

JSR $BC1B ;round FAC[...division code...]

So, discounting the divide-by-10 routine, there are three entry points to the BASIC ROM division routine, each requiring different setup procedures.

The following program shows an example of using the flpt ROM routines to load FAC from two different sources, do some division, and then print the results to the screen.

Please note that the comments and explanations immediately follow those sections of code they refer to.

The sourcecode was written using the "6510+ Assembler". Accumulator, X and Y registers are referred to as (A), (X) and (Y) respectively.

```
1000 *=$C0001010 ;
1020 JMP MAIN
1030 ;
1040 FLPDIV LDA $66
1050 EOR $6E
1060 STA $6F    ; Set sign compare
1070 LDA $61    ;(A) loaded with FAC exponent
1080 JMP $BB12  ;Divide. FAC=ARG/FAC
1090 ;
1100 FLPVTEXT TXT "4.831"
1110 BYT 0
1120 BYT 0,0
1130 COUNTER BYT 0 ;FLPVTEXT is a standard ASCII text string.
```

The following zero byte is the text terminator, the next two zero bytes simulate the end of a BASIC line to stop the ROM routine which converts the text from wasting processor time reading in the following machine code "garbage". Counter is used by the main loop.

```
1140 ;
1150 GETFLPV LDA #<FLPVTEXT
1160 STA $7A
1170 LDA #>FLPVTEXT
1180 STA $7B
```

```
1190 JSR $0079
1200 JMP $BCF3
```

To convert our text into a number in FAC we use the routine at $BC3F (FIN). The BASIC text pointer at $7A/$7B (TXTPTR) must point to the beginning of the text and (A) loaded with the first ASCII text byte by calling $79 (CHRGOT). The routine at $BCF3 evaluates the string (including characters such as +,-,.,E etc.,) and places the result in FAC. Just a few words on CHRGET.

CHRGET is a routine at $73-$8A, and is in fact probably the most important part of the BASIC Interpreter. The purpose of CHRGET is to find the next byte of BASIC text from either the input buffer ($0200-$0258) or from BASIC text. Immediately after the code which increments TXTPTR is the entry point CHRGOT at $79 which reads the current byte of BASIC text, starting with an LDA $xxxx command. Yes, self modifying code, which explains why this routine is immediately downloaded to RAM when the C64 is switched on, it won't work in ROM.

On exit from this routine (A) holds the byte of text read, and the Carry Flag is cleared if the byte is a decimal number (between ASCII codes #$30-#$39) else carry is set. Likewise, if a text terminator, either end-of-line (#$00) or a colon is found then the Zero Flag is set.

Most Wedge type programs such as those which add DOS or BASIC commands modify this routine.

```
1210 ;
1220 PRINTFLP JSR $BC1B ;First, the number has to be rounded by one bit. Routine name is ROUND.
1230 JSR $BDDD ;FAC=A/Y-ASCII$ AT $100;The routine FOUT converts the flpt number in FAC to an ASCII string terminated by a zero, starting at $0100. The contents of FAC are destroyed during the conversion. On exit, (A/Y) points to the start of the string.
1240 JSR $AB1E ;PRINT $, TERMINATOR=0;STROUT, at $AB1E, prints an ASCII string, terminated with zero, pointed to by the contents of (A/Y) which hold the low and high bytes of the location address.
```

An entry point at $AB24, although of no use to us in this program, is still of interest. Before calling, put the length of the string to be printed in (A) and start address of the string in INDEX1 at $22/$23 (standard lo/hi format). INDEX1 is part of the INDEX group of workspace bytes at $22-$25. INDEX2 is $24-25.

```
1250 LDA #13
1260 JSR $FFD2
1270 LDA #13
1280 JMP $FFD2;Two blank lines are printed by using the CHROUT ($FFD2) routine. To use CHROUT, load (A) with an ASCII byte and call $FFD2.
1290 ;
1300 MAIN LDA #0
1310 STA COUNTER;Initialise counter
1320 JSR GETFLPV;Put a number in FAC
1330 JSR PRINTFLP;Then print it
1340 LOOP LDX COUNTER
1350 LDA NUMTAB1,X;Load (A) with a number from the table
1360 JSR $BC3C;To convert (A) to a flpt number in FAC we are using an entry point in the SGN ($BC39) routine.
1370 JSR $BC0C;FAC is copied into ARG by using the routine MOVAF. Some data is lost as FAC is rounded before being copied. Don't worry, the rounding is on the smallest possible fraction and won't be noticed.
1380 LDX COUNTER
1390 LDA NUMTAB2,X;The divisor is fetched from its table.
1400 JSR $BC3C;Then converted to a flpt number in FAC.
1410 JSR FLPDIV
1420 JSR PRINTFLP;Divide ARG by FAC then print result.
1430 ;
1440 INC COUNTER
1450 LDA COUNTER
1460 CMP #5
1470 BNE LOOP;Loop till five numbers have been calculated and printed.
1480 RTS
1490 ;
1500 NUMTAB1 BYT 10,10,10,114,255
1510 NUMTAB2 BYT 5,1,2,4,31520 ;RESULT= 4.831,2,10,5,28.5,-.33...;NUMTAB1 numbers will be divided by the corresponding numbers in NUMTAB2. The comment in 1520 shows what the six printed numbers should be when the assembled code is run.
```

The following is a list of the major ROM routines concerning the SYS command and floating point mathematics. The first group of routines are for use when using machine code in conjunction with BASIC's "SYS" command. Those in the second group are for printing floating point numbers and the contents of the floating point accumulators. The rest of the routines are for use with flpt maths.

The basic format is-

1) *** GROUP HEADING ***

2) Official name or entry point, followed by ROM Address in hex.

3) Brief description of function.

4) Any SETUP procedures needed by the routine.

5) A complete description of the routine plus examples and extra notes if necessary.

BASIC ROM ROUTINES LISTING

*** SYS Input ***

FRMNUM: $AD8A

FUNCTION: Confirm expression.

DESCRIPTION: Sets up internal flags before the main expression evaluation routine, FRMEVL ($AD9E), is entered. Use this routine to evaluate any BASIC text expression which is expected to be anything other than a 1-byte integer.

EXAMPLE:

SYS 49152,A*320+(B+C).

If our code at 49152 ($C000) starts with

JSR $AEFD:

JSR $AD8A:

JSR $B7F7

the following occurs-

1) A comma is tested for and found.

2) The expression after the comma is evaluated and placed in FAC.

3) FAC is converted into a 2-byte integer which is placed in $14/$15 and (A/Y).

Entry point in CHKCLS ($AEF7): $AEFD

FUNCTION: Confirm comma.

DESCRIPTION: Check if the current byte of BASIC text is a comma. if not. a ?SYNTAX ERROR occurs. Use this to divide expressions when receiving multiple values from a modified SYS command.

EXAMPLE: SYS 49152,x,y.

Test for a comma before receiving the x and y value.

GTBYTC: $B79B

FUNCTION: Evaluate text to one byte in (X).

DESCRIPTION: The CHRGET routine ($73) is called. then the numeric expression pointed to by TXTPTR is evaluated. placed in $64/$65 (hi byte always=0) and confirmed. an error message (?ILLEGAL QUANTITY) is given if the value is not in the range 0-255.

(X) is loaded with the result from $64. and (A) loaded with the current byte of BASIC text.

GETNUM: $B7EB

FUNCTION: Get parameters for POKE and WAIT.

DESCRIPTION: The expression in text is evaluated and confirmed numeric. The first parameter is converted to a 2-byte integer in $14/$15 (LINNUM) and the second parameter converted to a single byte integer in (X). If a WAIT command contains a second 1-byte parameter the routine is reentered at $B7F1.

EXAMPLE: SYS 49152,8000,5. If a machine code routine at 49152 ($C000) calls $B7EB then the value 8000 will be placed at $14/$15 and (X) will be loaded with 5.

Entry point in GETNUM: $B7F1

FUNCTION: Test for comma. load (X) with value.

DESCRIPTION: Only two instructions at this point in GETNUM. JSR $AEFD tests for a comma. and JMP $B79E which converts an expression in BASIC text to a single byte integer in (X).

GETADR: $B7F7

FUNCTION: Convert FAC into 2-byte integer in $14/$15.

SETUP: FAC must contain a positive number below 65536.

DESCRIPTION: FAC is converted into a 4-byte integer. the lower 2 bytes are put into LINNUM ($14/$15). On exit (Y/A) contains the lo/hi bytes of the value.

*** Screen Output ***

STROUT: $AB1E

FUNCTION: Print ASCII string.

SETUP: (A/Y) points to the address of an ASCII string terminated with a zero.

DESCRIPTION: This is BASIC's main string output routine. The string is output to the current output device (usually the screen).

Entry point in STROUT: $AB24

FUNCTION: Print ASCII string.

SETUP: INDEX1 ($22/$23) holds the string address. (A) holds the length of the string.

DESCRIPTION: An ASCII String is output to the current output device. The string does not need a terminating zero.

Entry point in INPRT ($BDC2): $BDCD

FUNCTION: Print integer(A/X)

SETUP: (A/X) must hold a 2-byte unsigned integer. (0-65535).

DESCRIPTION: This is part of INPRT. the routine which prints the "IN ????" part of a BASIC error message. (A) and (X) are stored in $62/$63 (the FAC Mantissa) and the entry point at $BC49 is used to convert the integer to a flpt in FAC. then FOUT is entered at $BDDF to convert FAC to an ASCII number. The first character (a space or minus) is necessarily suppressed (via a clever piece of coding) by placing it into Zero Page location $FF. the rest of the string starts at $0100. Finally. the string output routine at $AB1E is called.

FOUT: $BDDD

FUNCTION: ASCII string=FAC

SETUP: FAC must be rounded. Example. JSR $BC1B (ROUND).

DESCRIPTION: The flpt number in FAC is converted to an ASCII string starting at $0100. This is a reserved area of memory at the low end of the

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stack. The string is terminated with a zero byte. The contents of FAC are destroyed in the process. On exit (A/Y) points to the start of the string.NOTE: The BASIC string output routine at $AB1E can be used immediately after this routine (no setup is required).

*** Loading the facs ***

FACINX: $B1AA

FUNCTION: integer(A/Y)=FAC

SETUP: FAC must hold a flpt number between -32768 and +32767 else an ?ILLEGAL QUANTITY ERROR will occur.

DESCRIPTION: FAC is converted into a 2-byte signed integer between -32768 and +32767 at $64/$65. The integer is then loaded into (A/Y). FAC is destroyed during this operation.

GIVAYF: $B391

FUNCTION: FAC=integer(A/Y)

SETUP: (A) and (Y) must hold the low and high bytes of a signed integer between -32768 and +32767.

DESCRIPTION: Converts a 2-byte integer into a flpt number in FAC.

Entry point within POS ($B39E): $B3A4

FUNCTION: FAC=Positive Integer(Y)

SETUP: (Y) must contain a value between 0-255.

DESCRIPTION: There are only two instructions in this routine- LDA #$00:BEQ $B391. Since (A) is always 0, the (A/Y) number passed to the GIVAYF routine will always be a positive integer between 0 and 255.

MOVFM: $BBA2

FUNCTION: FAC=flpt var(A/Y)

SETUP: (A/Y) must hold the lo/hi bytes of the address of a flpt variable.

DESCRIPTION: (A/Y) is stored in INDEX1 ($22/$23) and from there ($BBA6) the routine unpacks the flpt variable into FAC.Entry point in MOV2F ($BBC7): $BBD4

FUNCTION: flpt var(X/Y)=FAC

SETUP: (X/Y) must hold lo/hi of address where FAC is to be stored.

DESCRIPTION: There are four entry points in MOV2F, of which only this one is of much use to us. The routine stores FAC as a 5-byte flpt variable starting at the address pointed to by (X/Y).

MOVFA: $BBFC

FUNCTION: FAC=ARG

DESCRIPTION: ARG is copied into FAC and sets FACOV to 0, thus rounding off FAC very slightly.

MOVAF: $BC0C

FUNCTION: ARG=FAC

DESCRIPTION: FAC is rounded, then is copied into ARG.

Entry point in SGN: $BC3C

FAC=(A)signed

SETUP: (A) must hold a signed integer.

DESCRIPTION: (A) is converted into a flpt number in FAC.

Entry point in SGN ($BC39): $BC49

FUNCTION: FAC=integer($62/$63)

SETUP: $62/$63 must hold an unsigned integer. (X) must hold #$90, while the Carry Flag indicates the sign- SET=positive, CLEAR=negative.

DESCRIPTION: Located in the middle of SGN, a routine which returns the sign of a number in FAC as an flpt number in FAC (-1,0 or 1), this entry point converts an integer located in the first 2 bytes of FAC's mantissa (FACHO1/FACHO2) into a flpt number in FAC.

FIN: $BCF3

FUNCTION: FAC=ASCII string(TXTPTR)

SETUP: TXTPTR ($7A/$7B) must point to an ASCII string terminated with 0. (A) must hold the first byte of text in the string. To avoid possible BASIC pointer corruption, a further two zeros should be placed after the terminating zero.

DESCRIPTION: This routine evaluates a number which is in an ASCII string form and places it in FAC. The characters -,+,.,E, etc., are recognised.

NOTE1: The extra two zeros after the string terminator are only necessary if a reentry to BASIC mode will occur, as in a machine code subroutine called by BASIC.

NOTE2: To load (A) with the first text character, call the CHRGOT routine at $0079 after setting TXTPTR.

EXAMPLE:

LDA #<TEXT:

STA $7A:

LDA #>TEXT:

STA $7B:

JSR $0079 (CHRGOT):

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JSR $BCF3 (FIN).

*** Maths Operations ***

FADDH: $B849

FUNCTION: FAC=FAC+.5

DESCRIPTION: .5 is added to FAC.

FSUB: $B850

FUNCTION: FAC=MEM-FAC

SETUP: (A/Y) must point to address of a flpt variable.

DESCRIPTION: ARG is loaded with a flpt variable from an address pointed to by (A/Y). Then the following routine is entered.

Entry point in FSUB: $B853

FUNCTION: FAC=ARG-FAC

SETUP: Sign comparison must be set by EORing $66 (FACSGN) and $6E (ARGSGN), then the result placed in $6F (ARISGN). (A) must hold $61) FACEXP.

Example:

LDA $66:

EOR $6E:

STA $6F:

LDA $61

DESCRIPTION: FAC is subtracted from ARG, the result is placed in FAC.

NOTE: This routine simply reverses the sign of FAC before jumping to the addition routine at $B86A.

FADD: $B867

FUNCTION: FAC=MEM+FAC

SETUP: (A/Y) must hold the address of a flpt variable.

DESCRIPTION: ARG is loaded with a flpt variable pointed to by (A/Y), then the following routine is entered.

Entry point in FADD: $B86A

FUNCTION: FAC=ARG+FAC

SETUP: Sign comparison must be set by EORing $66 (FACSGN) and $6E (ARGSGN), then the result placed in $6F (ARISGN). (A) must hold $61 (FACEXP).

Example:

LDA $66:

EOR $6E:

STA $6F:

LDA $61

DESCRIPTION: FAC is added to ARG, the result is placed in FAC.

NOTE: although the convention for setup is to load (A) with FACEXP immediately before calling the routine, either (X) or (Y) can substitute because the actual FACEXP contents are irrelevant, the routine only needs the ZERO FLAG set according to FACEXP due to a BNE instruction encountered at $B86A, a necessary branch occurring if FAC and ARG are not equal. In practice though, use LDA $61 where possible.

FMULT: $BA28

FUNCTION: FAC=MEM*FAC. Perform multiply.

SETUP: (A/Y) must hold the address of a flpt variable.

DESCRIPTION: The flpt number pointed to by (A/Y) is put into ARG, then the following routine is entered.

NOTE: Within the ROMs are various flpt constants, such as PI. For example, the 5 byte flpt constant pi (3.147...) sits at $AEA8, so to multiply FAC by PI we merely load (A) with #$A8 and (Y) with #$AE then call $BA28.

Entry point in FMULT: $BA2B

FUNCTION: FAC=ARG*FAC

SETUP: Sign comparison must be set by EORing $66 (FACSGN) and $6E (ARGSGN), then the result placed in $6F (ARISGN). (A) must hold $61 (FACEXP).

Example:

LDA $66:

EOR $6E:

STA $6F:

LDA $61

DESCRIPTION: ARG is multiplied by FAC and the result placed in FAC.

DIV10: $BAFE

FUNCTION: FAC=FAC/10

DESCRIPTION: FAC is copied into ARG and (A/Y) pointers are set, pointing to the flpt constant at $BAF9 in ROM. The following routine is entered.

FDIV: $BB07

FUNCTION: FAC=ARG/MEM.

SETUP: (A/Y) must point to a 5 byte flpt variable, and (X) hold the sign comparison result byte, $61 (ARISGN).

DESCRIPTION: FAC is loaded with the flpt number at (A/Y) then the routine jumps to the entry point $BB12 in the following routine.

EXAMPLE:

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LDA #<VAR:

LDY #>VAR:

LDX $61:

JSR $BB0F

FDIVT: $BB0F

FUNCTION: FAC=MEM/FAC

SETUP: (A/Y) must hold address of a flpt variable.

DESCRIPTION: A flpt number at an address pointed to by (A/Y) is loaded into ARG, then the following routine is entered.

Entry point within FDIVT: $BB12

FUNCTION: FAC=ARG/FAC

SETUP: Sign comparison must be set by EORing $66 (FACSGN) and $6E (ARGSGN), then the result placed in $6F (ARISGN). (A) must hold $61 (FACEXP).

Example:

LDA $66:

EOR $6E:

STA $6F:

LDA $61

DESCRIPTION: ARG is divided by FAC and the result is placed in FAC. The extra setup is required dur to the start of FDIVT being bypassed when using this entry point.

Entry point in FIN ($BCF3): $BD7E

FUNCTION: FAC=FAC+(A)signed

SETUP: (A) must hold a signed integer.

DESCRIPTION: A signed integer in (A) is added to FAC. This is a jump into the part of FIN where numbers are added together. (A) is pushed onto the Stack, FAC is copied to ARG, (A) is restored then the following routine entered.

Entry point in FIN: $BD83

FUNCTION: FAC=ARG+(A)signed

SETUP: (A) must hold a signed integer.

DESCRIPTION: (A) is converted into a flpt number in FAC via $BC3C (FAC=(A)signed), then the following routine entered.

Entry point in FIN: $BD86

FUNCTION: FAC=ARG+FAC

DESCRIPTION: Immediately following the previous JSR $BC3C is LDA $6E:EOR $66:STA $6F:LDX $61:JMP $B86A. In other words, ARISGN is set, The Zero Flag is set according to the contents of FACEXP then an entry point in FADD is entered ($B86A) to add FAC to ARG, the result is returned in FAC. This entry point ($BD86) can be used to negate the need of the setup code needed before $B86A is called.

*** FAC Math Functions ***

ROUND: $BC1B

FUNCTION: FAC=rounded(FAC)

DESCRIPTION: FAC is rounded by one bit. Some routines need FAC rounded as a setup requirement.

SIGN: $BC2B

FUNCTION: (A)=SGN(FAC)

DESCRIPTION: FACEXP and FACSGN are examined to determine the sign of FAC, the result being returned in (A)-$00=FAC zero$01=FAC positive$FF=FAC negative

ABS: $BC58

FUNCTION: FAC=ABS(FAC)

DESCRIPTION: A zero is put into bit 7 of FACSGN, thus making FAC a positive value.

FCOMP: $BC5B

FUNCTION: (A)=comparison (FAC:flpt var(A/Y))

SETUP: (A/Y) must point to the address of a flpt variable.

DESCRIPTION: (A) and (Y) are put into INDEX2 ($24/$25) then the routine compares the flpt number with that in FAC. The result is returned in (A)-$00=FAC=flpt var.

$01=FAC>flpt var.

$FF=FAC<flpt var.

After the STA $24:STY $25 is an entry point at $BC5F, which is useful if a large number of values need to be compared, because INDEX2 can be directly loaded from tables, bypassing the need to use the (A/Y) setup. This routine doesn't destroy INDEX2.

INT: $BCCC

FUNCTION: FAC=INT(FAC)

DESCRIPTION: FAC is rounded DOWN to the nearest integer, but remains in flpt format.

NOTE: To round either up or down to the CLOSEST integer, .5 must be added to FAC first, use the .5 flpt ROM constant at $BF11.

Example:

LDA #$11:

LDY #$BF:

JSR $B867 (FADD):

JSR $BCCC (INT).

SQR: $BF71

FUNCTION: FAC=SQR(FAC)

DESCRIPTION: FAC is copied to ARG, the ROM flpt constant .5 put in FAC then the following POWER routine is entered.

Entry point in SQR: $BF78

FUNCTION: FAC=SQR(flpt var(A/Y))

SETUP: (A/Y) holds the address of a flpt variable.

DESCRIPTION: Loads FAC with flpt variable then continues into following routine.

FPWRT: $BF7B

FUNCTION: FAC=ARG to the power FAC.

SETUP: (A) must hold FACEXP ($61).

DESCRIPTION: ARG is raised to the power of FAC, the result is placed in FAC.

NEGOP: $BFB4

FUNCTION: FAC=negate(FAC)

DESCRIPTION: FAC is checked to see if it is zero, if not, FACSGN is reversed- positive into negative or negative into positive.

EXP: $BFED

FUNCTION: FAC=e to the power of FAC (probably).

DESCRIPTION: The flpt constant at $BFBF, 1.44269504 (1/LOG to base 2 e), is raised to the power of the value held in FAC.

POLYX: $E043

FUNCTION: Series evaluation.

SETUP: (A/Y) points to an address containing the number of constants in the series, which is followed by the series of 5-byte flpt constants.

DESCRIPTION: Series evaluation, used by SIN, LOG, ATN functions, etc.

COS: $E264

FUNCTION: FAC=COS(FAC)

SETUP: FAC value must be in RADIANS.

DESCRIPTION: Actually, this is FAC=SIN(FAC+PI/2). PI/2 is added to FAC then the following routine is entered.

SIN: $E26B

FUNCTION: FAC=SIN(FAC)

SETUP: FAC value must be in RADIANS.

DESCRIPTION: The SIN operation is performed on FAC, the result placed in FAC.

TAN: $E2B4

FUNCTION: FAC=TAN(FAC)

SETUP: FAC value must be in RADIANS.

DESCRIPTION: The TAN operation is performed on FAC, the result placed in FAC.

ATN: $E30E

FUNCTION: FAC=ATN(FAC)

DESCRIPTION: Returns ArcTangent of FAC in RADIANS.

Next month we will draw circles on a bitmap screen using nothing but the inbuilt floating point maths functions including SINE, examine BASIC's USR function, and take a look at some graphics formats.

Any questions regarding machine code, or the acquisition of a copy of the excellent "6510+ Assembler" package can be sent to me directly at:

32 Renfrew Crescent
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EDITOR'S NOTE: Source code for the FLPT primer routine in this article will be found on the "magazine" side of our next Disk-Coverer.

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Hello Everyone.

Another column to wear down your fingernails, so without too much preamble we will start off with some more text tricks from the wonderful world of the 64.

SHAKING ALL OVER

```
10 POKE53281,0:PRINTCHR$(147);CHR$(153);
30 FORK=1TO55 :PRINT"COMMODORE
NETWORK-";: NEXT:FORDE=1TO500:NEXT
60 F=3: FOR R=0TO15 STEPF : POKE53270,R :
NEXT: REM F=(1TO7):POKE SHRINKS SCREEN
70 FOR R=15TO0 STEP-F :POKE53270,R: NEXT
80 FOR T=1TO3000:NEXT
100 POKE53270,PEEK(53270)OR8 :
PRINTCHR$(147) : END :REM
POKE/PEEK=NORMAL SCREEN
```

The VIC II chip allows us to put the 64 into a 38 column by 24 row mode(shrinks the size of the screen).

This mode is used when you want to scroll,and also for some of these routines. The smaller screen gives you a place to scroll your data from.

For 38 columns:-POKE 53270, PEEK(53270) AND 247

To return to 40 column mode:-POKE53270, PEEK(53270) OR 8.

For 24 row mode:-POKE 53265, PEEK(53265) AND 247

To return to 25 rows:-POKE53265, PEEK(53265) OR 8

```
110 REM EASY CENTRE PRINT
120 PRINTCHR$(147);CHR$(158): POKE53281,0
130 DEFFNA(X)=(40-LEN(M$))/2
140 PRINT"(10 down)": rem position of first line
150 M$="THIS IS THE FIRST LINE":PRINTTAB (FNA
(X)) M$ : rem just add M$="(string)" for each line you
need.
190 END
```

If you POKE 22,35 you will not have line numbers when you list: POKE 22,25 will get them back.

ROCKING TEXT

```
220 PRINTCHR$(147);CHR$(150):POKE53281,0
240 FORK=0TO30:PRINT"ROCKABYE TEXT-DON'T
GOTO SLEEP-";:NEXT
270 FORLR=0TO7:
POKE53270,(PEEK(53270)AND248)+LR : NEXTLR
280 FORRL=7TO0STEP-1:
POKE53270,(PEEK(53270)AND248)+RL : NEXTRL
290 for time=1to 3000:next time
300 poke 53270,peek(53270) or 8 : end
```

If your program has a save feature in it and you want to check out the directory without leaving the program, this next one will do it for you.

IN PROGRAM DIRECTORY

```
10 INPUT "SEE DIRECTORY (y/n)"; D$12 IF D$ = "Y"
THEN GOSUB 60013 IF D$ = "N" then do something
else
14PRINT"PRESS A KEY"
16 POKE198,0: WAIT 198,1 : GET K$
18 IF K$="" THEN RETURN TO WHERE YOU WANT
TO
600 PRINTCHR$(147);CHR$(5) : POKE 53281,15
605 Q$=CHR$(34):OPEN2,8,0,"$0 : "
607 GET#2,A$:A=-(ST<>0)-
2*(A$=Q$):ONAGOTO608,610:GOTO607
608 T=0:CLOSE2:RETURN
610 GET#2,A$:A=-
(A$=Q$):ONAGOTO612:B$=B$+A$:GOTO610
612 PRINTB$:B$="":GOTO607
```

Here is a nice little M/L APPEND program. The System Address is 828 at the moment, but by changing SA you can relocate it any where. As you will notice the program NEWs itself after running, so SAVE it before you use it.

Remember! The appended program line numbers must be higher than the one in memory.

```
900 SA=828:Q$=CHR$(34)
905 FORX=SATOSA+85:
READA:POKEX,A:NEXT
910 PRINTCHR$(147);CHR$(5):
PRINT"SYNTAX:=
SYS"SACHR$(157)CHR$(44)Q$"FILENAME"Q$
915 NEW
920 DATA32, 253, 174, 32, 115, 0, 166, 122,
164, 123, 134, 187, 132, 188
925 DATA232, 134, 183, 32, 115, 0, 240, 2, 208,
249, 165, 34, 164, 35
930 DATA183, 133, 183, 169, 8, 133, 186, 32,
51, 165, 166, 34, 164, 35
935 DATA 169, 0, 133, 185, 32, 213, 255, 176,
21, 134, 45,132,46,134
940 DATA47, 132, 48, 134, 49, 132, 50, 32, 51,
165, 160,106,32,47
945 DATA 241, 96, 72, 160, 0, 32, 47, 241, 104,
24, 105,48,32,210
950 DATA255,96
```

DEF FN

Defining and using functions.This is one that is used a lot in the Bitmap Routines. It can be used to allow your program to DEFine a FunctioN not otherwise available in Commodore Basic, when you need a sequence of calculations carried out without typing the whole thing out every time you need them.To use a function, you must first define what is going to do. For instance:-

120 DEF FNA(x)=4*x+36 defines a function called "A". The number that a function operates on is known as its ARGUMENT. This case is (x), which it then multiplies by 4, and then adds 36.If a program with an argument of 10, you would have this:-

200 PRINT FNA(10)

This would PRINT the value of the function which is: 4*10+36,or 76.

Once a function has been defined in a program, you can use it and its argument just like any other number or numeric variable. You can add, subtract, divide and multiply functions and their arguments together.

Here is a small program that puts the function to work to produce a numerical result which is then printed. It takes the distance of a star in light years and converts it into a distance in miles. The function in line 50 does the conversion multiplying the input number by 5.88.

STAR DISTANCE

```
10 PRINT CHR$(147):POKE 53281,0
20 POKE 214,5:PRINT
50 DEF FNC(L)=L*5.88
70 PRINT TAB(3)"ENTER STARS DISTANCE IN
LIGHT YEARS":PRINT:PRINT TAB(15)
80 INPUT L
90 PRINT
100 PRINT"THE STAR IS ";FNC(L);" THOUSAND
BILLION"
110 PRINT:PRINT TAB(10);"MILES FROM
EARTH":END
```

Lets go back to our Bitmap that we started last column. We have moved the Basic storage area to keep our program safe, and with lines 100 and 110 told the 64 to use the high resolution mode, and 8000 bytes of memory starting at 8192.

The subroutine starting at line 200 clears the screen by POKEing zero's into the 8000 bytes. Lines 220 and 230 are the instructions to go through 1000 bytes (1024 to 2023) to set each of the bytes with the variable COL. (colour). Having 1000 bytes of colour and 8000 bytes of pixel memory means each byte of colour memory controls the foreground and background colour for 8 bytes of pixel memory.

High Resolution colour codes are different from normal screen colour codes. In each byte of colour memory BITS 4 to 7 control the foreground colour of an 8x8 pixel block, whilst BITS 0 to 3 control its background colour. By POKEing selected numbers into colour memory with the variable COL you create any fore and background colour you choose.Here is a list of HI-RES colour codes which are added together:-

COLOUR	F/GRD	B/GRD
black	0	0
white	16	1
red	32	2
cyan	48	3
purple	64	4
green	80	5
blue	96	6
yellow	112	7
orange	128	8
brown	144	9
l/red	160	10
d/grey	176	11
m/grey	192	12
l/green	208	13
l/blue	224.	14
l/grey	240	15

If you want to draw in white on a red background, the combination would be 16+2,or 18

This is the reason clearing the screen is so slow. 9000 separate POKES. The only way to speed this up is to use Machine Code. No need to understand the code, but in place of Subroutine 2 type this, AND REMEMBER, SAVE SAVE SAVE BEFORE YOU RUN.

SUBROUTINE 2

M/L CLEAR BITMAP

```
1 GOTO 10
2 POKE 53272,PEEK(53272) AND 247
3 POKE 53265,PEEK(53265) AND 223
10 GOSUB100
20 COL=18:GOSUB200
30 end
100 POKE53272,PEEK(53272)OR8
110 POKE53265,PEEK(53265)OR32
120 RETURN
200 DATA0,165,252,197,254,208,7,165
210 DATA251,197,253,208,1,96,160,0
220 DATA173,80,195,145,251,230,251
230 DATA208,232,230,252,76,81,195
240 RESTORE:FORC=50000TO50029
250 READBYTE:POKEC,BYTE:NEXTC
260 POKE251,0:POKE252,4:POKE253,232
270 POKE254,7:POKE50000,COL:SYS50001
280 POKE251,0:POKE252,32:POKE253,64
290 POKE254,63:POKE50000,0:SYS50001:RETURN
```

SAVE before you run it in case of an error. In any case if you type RUN 2 (return) you will have your lo-res screen back, and if there is an error you can check your typing

Now we want to light up or turn off those pixels, and we have looked at Bit Masking earlier.

The bits are numbered horizontally from 0 to 319, and 0 to 199 vertically and these have to linked to the bytes on the screen (8192-16191).

If you stored all the information for the complete screen, you would not have much memory left for anything else. We can avoid this with two equations.

One tells you which byte the pixel is in, given its co-ordinates, the second gives you a bit mask value. The bit masking takes these values and has them ready for the next subroutine. Here are the subroutines that will do it all for you. Just add them to the previous subroutine and SAVE them.

All subroutines will be number compatable with each other:-

SUB ROUTINES 3

```
300
BYTE=8192+INT(LY/8)*320+INT(LX/8)*8+(LYAND7)
310 MASK=2^(7-(LXAND7))
320 RETURN
```

SUB ROUTINE 4

```
400 GOSUB300
410 POKEBYTE,PEEK(BYTE)ORMASK
420 CMEM=1024+INT(LY/8)*40+INT(LX/8)
430 POKECMEM,COL
440 RETURN
```

SUB ROUTINE 5

```
500 GOSUB300
```

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```
520 POKEBYTE,PEEK(BYTE)AND(255-MASK)
530 RETURN
```

Save this set of routines (2-5), then all you will have to do is load them up and add programs to them .

Now after all that typing we will have to see them at work. Here is a simple line drawing program. Just rewrite the start of the program:-

DRAWING PARALLEL LINES

```
10 GOSUB 100
20 COL=18:GOSUB 200
30 FOR LY=80 TO 120 STEP 10
40 FOR LX=100 TO 220 : rem set the values
50 GOSUB 400 : rem the subroutine will calculate them
60 NEXT LX
70 NEXT LY
80 END
```

Just experiment with the values in lines 30-40 to get a better idea of what is happening.

Next column we will try some more complicated designs.

Happy Programming.

Kev.

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Memory Management

The first in a series

RECONFIGURE

These days, with large software companies producing huge front end programs requiring up to 16MB of RAM, hardware suppliers are cleaning up as power users scramble to add yet another 4MB just to stay in the race. In light of this it would be easy to be fooled into thinking that a mere 64K was incapable of producing anything of worth at all.

Ask an IBM programmer to write a program like Geos, Project Stealth Fighter,Turrican or Shoot Em Up Construction Kit, then tell them "Oh by the way you only have 64K to work with" and stand back and watch as the panic sets in !

However, over the years C64 programmers have done all this, and a lot more. This has been achieved by basically working with the tools at hand.

The original designers of the C64 obviously had a good think about just how their technology might be used in future years - hardware sprites & smooth scrolling, a sophisticated sound chip, programmable disk drive - these are just a few of the powerful (& often unique) features of this innocent looking unit. Even with the ready availability of these various goodies, Commodore 64 programmers need to be continually aware of the memory restrictions and tight & efficient programming is a must for any ambitious work.

In this series of articles I plan to take a look at some useful aspects of memory management for programmers.

Most examples are in common use and I have used them myself in various programs, and so I can recommend their efficiency.

Whenever possible examples will be in Basic, however they can easily be translated to Machine Code by those who work solely in this area. For the same reason all numerical data, memory areas, etc. will be in decimal rather than hexadecimal.

In this first article we'll take a look at

:SELECTING BANK 3

Bitmapped graphic screens use up a lot of memory - one such screen requires 8000 bytes. For this reason user designed characters are often used in graphic based C64 programs.

User designed characters can take advantage of repetition on the graphic screen.

For example the pattern of a brick wall can be attained by just designing one character as a brick & then using that same character over and over again.

The screen holds 1000 characters (40x25), so by using this method a graphics screen can be represented by just 1000 bytes, compared to 8000 for a bitmapped screen.

The mechanics of redesigning the Commodore 64 character set are well documented in many C64 books and magazines, and Character Designers abound in the Public Domain so I won't go into this here (Although later I might cover it briefly).

One major problem arises when using redesigned characters. The data for the new characters must be placed in an area where the video chip can see it and the video chip can only access 16K at a time.

On power up this 16K area is at Bank 0 (0-16383) so the character data cannot be placed above 16384. This puts it right in the middle of the Basic RAM area, severely restricting the growth of any Basic program.

However the video bank can be changed. There are 4 X 16K banks available and the best bet is in this case Bank 3 (49152-65535).

By reconfiguring to Bank 3 the character data can be stored from 49152 on, outside of the Basic area and thereby solving the aforementioned dilemma.

The most common place in Bank 3 for character data (generally 2048 bytes for 256 characters) is 51200-53247. Hidden RAM could also be used - we'll discuss this in a future episode of this series.

A short BASIC routine will enable you to reconfigure to Bank 3 and move the current character set out of ROM (behind 53248) to memory at 51200.

RECONFIGURE TO BANK 3

```
10 BN=3
20 POKE 56334,PEEK(56334)AND254
30 POKE 1,PEEK(1)AND251
40 POKE 781,9:POKE 782,0:POKE 88,0
50 POKE 89,208:POKE 90,0:POKE 91,216
60 SYS41964
70 POKE 1,PEEK(1)OR4
80 POKE 56334,PEEK(56334)OR1
90 POKE 56578,PEEK(56578)OR395
POKE56576,(PEEK(56576)AND252)OR(3-BN)
100 POKE 53272,18
110 POKE 648,196
120 END
```

By way of explanation:

Line 10 - Establish Bank # (3 in this case)

Line 20 - Turn off timer

Line 30 - Access Character data through onboard I/O port

Lines 40-60 - This routine allows a fast transfer of the character data from 53248 Character ROM to its new home at 51200. It sets up and accesses a ROM memory move routine at 41964

Line 70 - Resets I/O Port

Line 80 - Enable Timer

Line 90 - Set Direction RegisterLine 95 - Tell the 64 it is now using bank 3

Line 100 - Tell the 64 the new position of the Character data

Line 110 - Tell the 64 the new position of the screen(I am putting together a support disk for this series and it will include all of the program examples and utilities described in these articles. More about this in a future article.)

Once this program is executed:

The screen is at 50176 The character set is at 51200

Sprite pointers are at 51192All sprite data must be at 41952 on.

In normal circumstances the screen is at 1024.

49152+1024 = 50176 so it is in the same place relatively speaking, as it was in bank 0.

The same applies with the sprite pointers, previously 2040 but now located at 51192 (49152+2040).

When the program is run, you will need to clear the screen because any data that was previously at 50176-

They're all here!

WOW!

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51175 will, of course, now be shown on the screen.

Any new character set you design will have to be loaded or poked into memory at 51200-52347.

After running the program, test it out by poking a 1 to the screen at 50176. The letter 'A' should appear at the top left of the screen.

So all you need to do to take advantage of this new configuration is design your new characters and load them in.

You will then have access to the redesigned characters plus all of 2048-40959 for Basic or Machine Code, and plenty of room here for any sort of data storage that is required. And you still have 49152-51199 free for any sprite data, machine code routines etc.

A very large percentage of C64 programs use graphics screens made up of redesigned characters, and in many of these cases Bank 3 is used, giving the programmer a large chunk ofcontinuous free RAM for the working code of the program.

Next time we'll look at saving specific sections of memory to disk and loading data files into a running BASIC program.

'Till then keep pressing those keys !

Peter Boothman

In this issue of C.N., Andrew Gormly interviews up-and-coming C-64 tyro, Paul Gardner-Stephen.

CN: Paul, you're the author of 64NET, a program given much attention both hereand overseas. How would you describe its function?

PGS: I guess basically it links a PC with a Commodore, meaning that you can use the peripherals of the PC for your Commodore. It means that instead of having to buy very expensive equipment you can buy an incredibly cheap PC and use its stuff - the only good reason for a PC.

CN: Where did the idea for 64NET first originate?

PGS: Back in 1991 when I had a Commodore 64 with no disk drive and a crappy XT.

CN: So you decided there and then to link the two?

PGS: Yes. The original version was very botchy - it basically just had save and load and that was it.

CN: How long did it take to complete 64NET to your satisfaction?

PGS: Well, it's not completed to my satisfaction yet! It's more like an ongoing process - as you're probably aware it's still a beta version. Some things are working properly, some aren't, and the things that aren't working are those which I have to spend time on to fix.

CN: Obviously, any program - no matter how simple the author tries to make it - is going to cause some people difficulty in using it. Do you get many queries from users of 64NET?

PGS: Yes. Partly because the documentation is about as finished as what the program is, if not less, and Russell Alphey is writing the manual some eight hundred kilometers from here. He works full-time,so his time is a little bit limited as well.

CN: So is it difficult to have him writing the manual there and you writing the program here?

PGS: Only for him! It's easy for me, because I'm not that good at writing documentation. Apparently the German version of the manual is a lot better - they've actually done a review in a purely objective manner, and done it quite well.

CN: Are there any planned upgrades in the pipeline?

PGS: There are always planned upgrades. Normally there's a new version done about every fortnight,

so that anyone who has a registered copy can download the latest one from my bulletin board.

CN: What other software projects are you currently working on?

PGS: Squeamix, which is a UNIX-like operating system for the 64 so that it will actually use language properly.

CN: And how did you first become involved with programming?

PGS: Basically games get a bit boring. Back at the first primary school I went to, it was inmy second year that they got computers and they were C64s. My next primary school - Commodore 64s. Then on to high school - Commodore 64s! Incidentally,it wasn't until 1991 that I actually got a 64, even though I'd been using them since about 1985.

CN: So you first started programming at school?

PGS: Yeah - I was playing around with the computers and things happened from there.

CN: You're also working on some hardware items now, aren't you?

PGS: Always. That tends to get a bit limited by the finances though.

CN: Such as?

PGS: Well, an accelerator of sorts - I've got a few plans for that. Later this year a friend from the United States will be coming to Australia for a few months and we'll be working on some gear then. Between us we should be able to come with some hardware, as we should be able to come up with some money to finance it.

CN: You've been running Fishbowl BBS in South Australia for a while now - what prompted you to establish the system?

PGS: It's cheaper to run a bulletin board than it is to call one, and there weren't many Commodore support BBSs in the region. There's good old SA Country Club, and they're OK as they've got plenty of files, but the SysOp's philosophy of running a bulletin board was no maintenance, no maintenance, no maintenance. It works quite well considering that, but he doesn't go through and check files or anything like that. It was a bit of a gamble, but it's good to have the system up now.

CN: So does Fishbowl take up much of your time?

PGS: No! I've just adopted the policy of no support also, but not quite. The good thing is that I can direct the support, so the Commodore 64 section gets a lot of support, and the PC and Amiga sections - however small they are now - don't.

CN: You're also one of the priveleged

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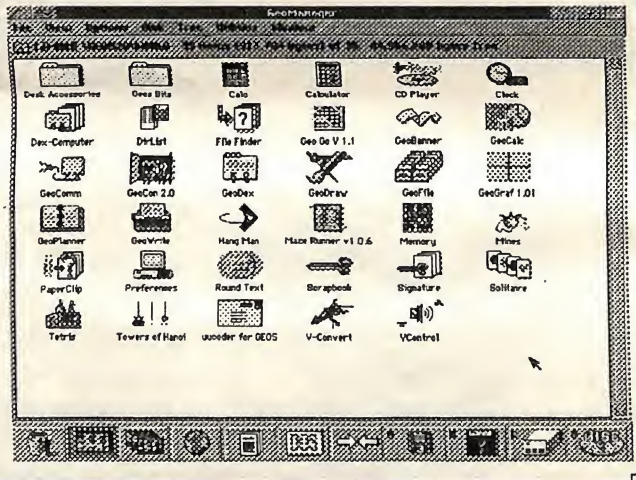

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owners of a Commodore 65. How did that happen, andwhat it your opinion of the machine?

PGS: Ah, I knew the right person at the right time. I got it sent in from Germany, and it's a very nice machine.

CN: And what does your current set-up look like?

PGS: Well, there's the two 64s set up normally. One of them has a 1541-II, a 1581, a 256K REU, a 2 meg RamDrive, Action Replay, Swiftlink cartridge, an Aprosand 4-port expander which is quite obviously full, and an Amiga 1081 monitor which works on the 65 as well. The other 64 is just the leftovers. It's a 64, a 1541, often the Action Replay. The 65 shares the 1081 Amiga monitor.

CN: I understand that you're also involved in the demo scene. How did that come about, and what sort of things do you do?

PGS: Not really anything major - I'm a member of Fairlight under the handle of Highlander, and my main function is to help with their wares and stuff on my bulletin board.

CN: And what do you think of the demo and programming scenes these days?

PGS: The demo scene has picked up in the last twelve months for the first time in the past four years. I think a lot of the people who went over to the Amiga are switching back, realising that it's a friendly scene, you don't have any tall poppy syndrome, and it's just a nice machine to program on. You don't have to fork out a fortune for expensive hardware, what works on one 64 will work on another without needing a 68040 or something like that. Yeah, they're realising that it may not be new, it may not be the fastest thing on the market, but it's a fun thing to program on.

CN: And what advice can you give to all of the Commodore users out there who are hungry for support?

PGS: Keep going, talk to each other - if you can, get a modem, and if you can, get an Internet account, because there are many FTP sites on the Net which have Commodore files. There's one which has about 600 Meg, and that's just one. You get a lot of support. You talk to a lot of other people on the scene, you find out what's happening, and you get a lot of help. There was one guy just recently who was working on a 128 mod player who got a bit stuck, so he logged onto Internet RElay Chat, asked a few people, and it was as easy as that. Problems that otherwise wouldn't be solved now can be.

CN: So the Internet's the way forward then?

PGS: It's definitely a way forward. It's a good, cheap and easy way to keep in contact, and to make contacts all around the world, because snail mail just doesn't really help out there.

CN: And where do you plan to take your own Commodore future?

PGS: Squeamix is taking up much of my time at the moment, and hopefully there should be a beta out by the end of the year. I can't say too much about that in case it doesn't happen, but it's stilldefinitely in the moulding stage. 64NET's still going to be happening and I'm working on a few new version of it at present, including one which will work over the Internet so that you can load from someone's hard drive in Finland. I've been playing with the interface. Also there's a form of 64NET thatrequires no wedge and that runs through the serial port, so that's all coming along well.

CN: Thanks for your time, Paul.

PGS: Pleasure.

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